VOL. LXXXV PART NINE

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

SEPTEMBER 1960

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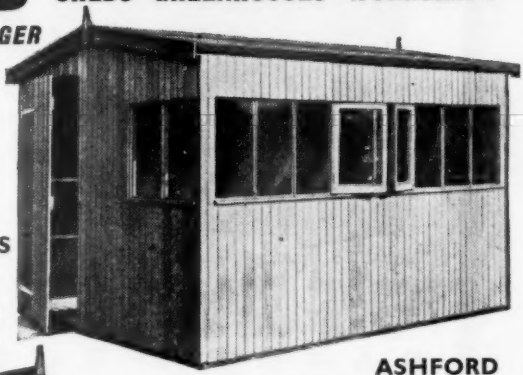

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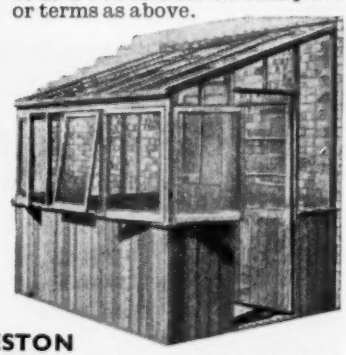

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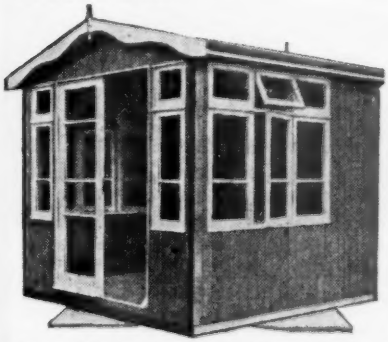

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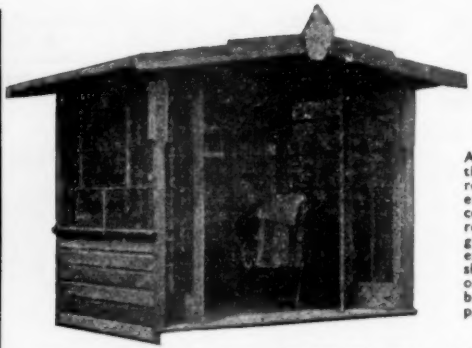

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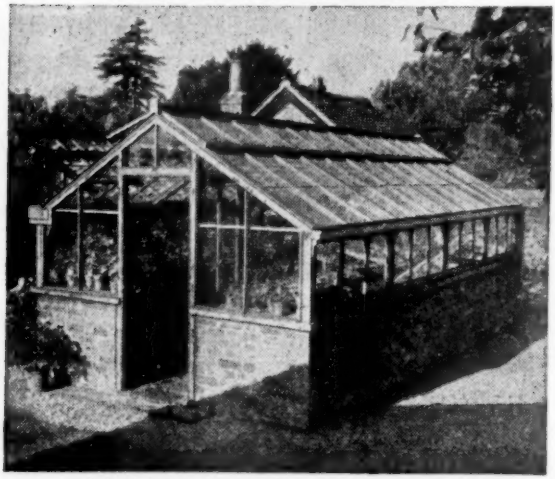

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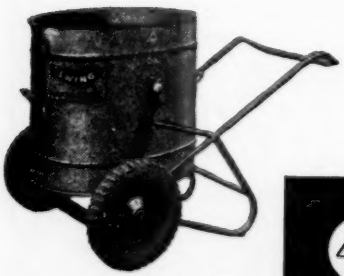

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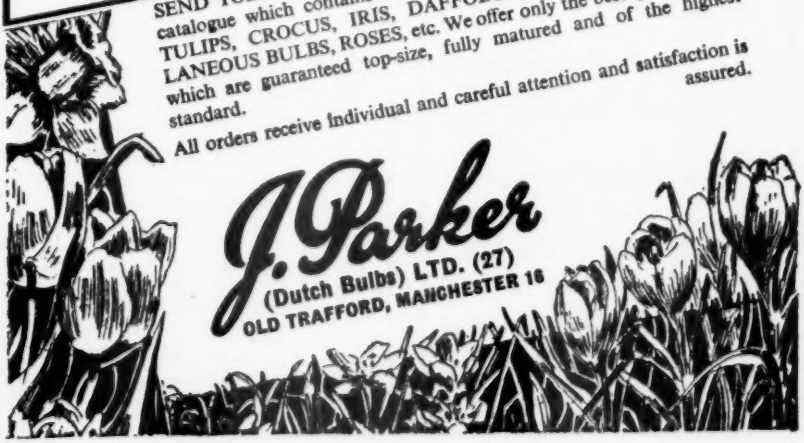

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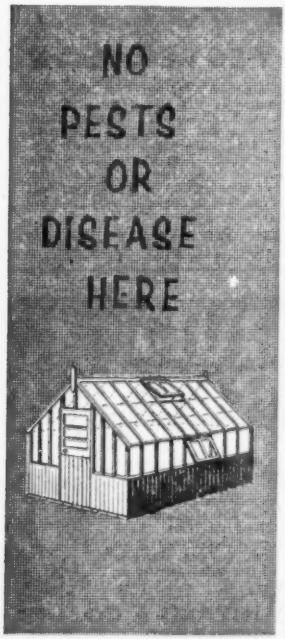

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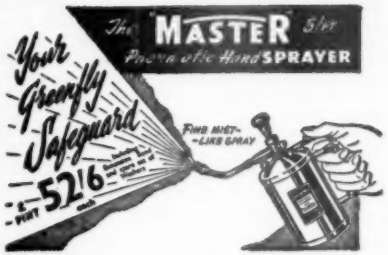

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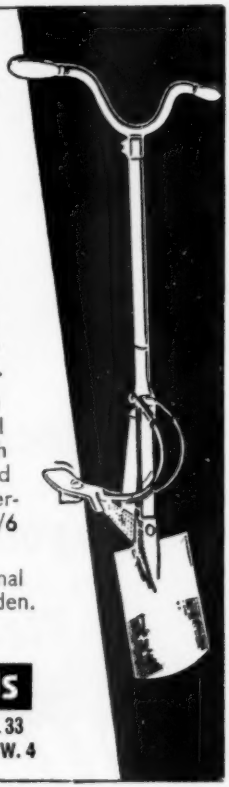

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXXV PART NINE

SEPTEMBER 1960

THE SECRETARY'S PAGE

ANNOUNCEMENTS—SEPTEMBER AND OCTOBER

Shows

TUESDAY, September 6 1 P.M. to 7.30 P.M. WEDNESDAY, September 7 10 A.M. to 5 P.M.	National Dahlia Society's Show, in both Halls.
FRIDAY, September 9 11 A.M. to 7 P.M. SATURDAY, September 10 10 A.M. to 5 P.M.	National Rose Society's Show (both Halls on September 9, New Hall only on September 10).
TUESDAY, September 13 12 NOON to 6 P.M. WEDNESDAY, September 14 10 A.M. to 5 P.M.	Fortnightly Flower Show, Tree and Shrub Competition, Alpine Garden Society's Competition and Cactus and Succulent Society's Competition, in the New Hall.
FRIDAY, September 16 1 P.M. to 7.30 P.M. SATURDAY, September 17 10 A.M. to 6 P.M.	National Chrysanthemum Society's Show, in both Halls.
TUESDAY, September 27 12 NOON to 7 P.M. WEDNESDAY, September 28 10 A.M. to 7 P.M. THURSDAY, September 29 10 A.M. to 5 P.M.	**Great Autumn Show,** in both Halls.

Shows—*continued*

TUESDAY, October 4 12.30 P.M. to 6 P.M. WEDNESDAY, October 5 10 A.M. to 5 P.M.	Fruit and Vegetable Show, in the New Hall.
TUESDAY, October 11 12 NOON to 6 P.M. WEDNESDAY, October 12 10 A.M. to 5 P.M.	Fortnightly Flower Show, Conifer Competition, Tree and Shrub Competition and Saintpaulia and Houseplant Society's Competition, in the New Hall.
TUESDAY, October 25 12 NOON to 6 P.M. WEDNESDAY, October, 26 10 A.M. to 5 P.M.	Fortnightly Flower Show and British National Carnation Society's Competition, in the New Hall.

Lectures

TUESDAY, September 13, at 3 P.M. "Late-flowering Trees and Shrubs", by MR. H. G. HILLIER, F.L.S., V.M.H.

TUESDAY, September 27, at 3 P.M. "Dahlias and their cultivation", by MR. STUART OGG.

TUESDAY, October 4, at 3 P.M. "Virus diseases of Fruits", by DR. A. F. POSNETTE.

TUESDAY, October 11, at 3 P.M. Masters Memorial Lecture: "Insects and Horticulture", Part I, by PROF. H. W. MILES, M.SC., D.SC.

TUESDAY, October 25, at 3 P.M. Masters Memorial Lecture: "Insects and Horticulture", Part II, by PROF. H. W. MILES, M.SC., D.SC.

Demonstration at Wisley—On Wednesday, September 21, there will be a demonstration at Wisley on Digging, Manuring and Composting, commencing at 2 P.M. The demonstration will be repeated at the same time on Thursday, September 22.

Lily Group Meeting—The Lily Group will hold a meeting in the Lecture Room in the New Hall on Tuesday, October 11, at 4.30 P.M., when there will be a Discussion on "Colchicums". In connection with this discussion there will be a Co-operative exhibit of Colchicums staged at the Fortnightly Show and any Fellow who can contribute to this is asked to inform the Secretary of the Lily Committee not later than the previous Wednesday.

Conifer Competition—As in most places conifers are carrying an unusually good crop of cones it has been decided to have a series of competitive classes for conifers in fruit at the Fortnightly Show on October 11 and 12, on which occasion there will also be competitive classes for trees and shrubs with ornamental fruits or coloured foliage. Schedules may be obtained from the Secretary.

The Society's Examinations—The Preliminary Examination for the National Diploma in Horticulture will be held on Saturday, November 19, 1960. The closing date for entry is October 1, 1960.

Restaurant at Wisley—The Restaurant at Wisley will be closed after October 2. It will reopen in 1961 on a date to be announced.

NOTES FROM WISLEY

N. K. Gould

SEPTEMBER is a month of many pleasant features in the garden, combining a final rather exuberant flowering of summer bedding plants and annuals with the reappearance of the blooms of many bulbous plants which have been out of sight and out of mind for a period. These come rather suddenly and usually very punctually almost before one is ready for them and it may seem rather incongruous that the first flowers of *Cyclamen neapolitanum* should appear in the wild garden at Wisley often in early August while the late *Rhododendron arborescens* growing nearby is still at its best.

Soon afterwards comes *Leucojum autumnale* with flowers like fragile snowdrops, in the rock garden and many other places at Wisley, and *Zephyranthes candida*, a small white-flowered plant, appears in the border at the foot of the west wall of the Laboratory. Unfortunately this is the only member of a genus containing several very handsome rose-pink species which is sufficiently hardy to grow out-of-doors here.

The most conspicuous of the autumn flowering bulbs are the colchicums. These are planted extensively in Seven Acres, the wild garden and elsewhere and they are extremely useful for gaps between shrubs and in places where their copious spring foliage can be allowed to die down naturally, which it does around midsummer. In neat and tidily kept borders these huge leaves turning to yellow and finally brown and sprawling about on the ground can be quite objectionable, but it is important not to remove them too soon, and it is a mistake to pull the great clusters of leaves out of the soil when they begin to fade, as the basal part, if allowed to decay in the natural way, leaves a firm brown tube from the top of the corm to the surface of the soil through which the tender flower-bud may develop without obstruction. Among the more rewarding species one can plant are *C. speciosum* in many rich purple and reddish forms as well as an immaculate white one, and *C. cilicicum* which raises its bright rosy-purple flowers only a few inches above the soil in clusters of as many as twenty from one bulb. There are at the present time some very beautiful hybrids including one named 'Waterlily' which has very large double flowers composed of a great number of soft rosy-lilac petals. Some of these superior

kinds may seem to be rather highly priced in the catalogues, but as they increase rapidly they must be considered a good investment.

The many different forms of *Amaryllis belladonna* to be seen growing just inside the main gate at Wisley, near the frameyard wall and in the half-hardy house, are most useful for sunny situations near walls with south or south-west aspects where they will not be too heavily overshadowed during spring and summer by neighbouring plants, for it is upon the luxuriant growth of their foliage that the display of flowers depends. The varieties 'Rubra' and 'Kewensis' growing in the half-hardy house are both very tall and robust plants with stout purple scapes bearing heads of unusually large flowers with segments up to 5½ inches long. In each of these the colour varies around the Solferino Purple (26/2) of the Horticultural Colour Chart, which is appreciably darker than the colour of the ordinary forms. We also grow a very fine white variety named 'Hathor' in the frame between the glasshouses. In the same frame there are quite a lot of other bulbs including a number of hybrid watsonias, tigridas, *Vallota speciosa* and a pretty salmon-pink variety of that species sent to us recently by a friend of the Society in the Cape Province.

In the higher part of the alpine meadow the first crocus flowers are appearing and the turf will be dappled with the rosy-lilac blooms of *C. kotschyanus*, more generally known as *zonatus*, opening in the sun to reveal its vivid orange throat. There is a variety of this named *leucopharynx*, lacking the basal colour, growing in the rhododendron species beds on Battleston Hill. In the wild garden one may see the long violet buds of *C. nudiflorus* shoot up in many places although its fine grassy leaves do not appear until the spring. This is an excellent species to plant where it may remain undisturbed for a long time as it spreads about widely by means of very slender white underground stems. No crocus is more lovely in the autumn sunshine than *C. speciosus* which has broad petals of bright blue-purple finely pencilled with a darker hue.

Among the floral trials which will be of interest now we may call attention to the trial of annual asters, or more correctly *Callistephus chinensis*, of which there are about 170 stocks, among them some of the newer continental wilt-resistant varieties. There is also a collection of fifty varieties of *Calluna vulgaris* or heather planted on the high ground south of Weather Hill. This is not truly an "invited trial" but a collection designed with the purpose of settling some problems of nomenclature. Some awards may be recommended to meritorious varieties. Among the herbaceous perennials are the early flowering chrysanthemums which were first inspected by the committee in early August. The trial this year numbers 163 stocks as it incorporates what has in former years been the southern trial held by the National Chrysanthemum Society. Next to the chrysanthemums on the site of the old Azalea Garden are the gladioli, including some recent acquisitions, and on the heavier soil of this part of the garden they should grow extremely

well. The trial of dahlias is planted on an adjacent plot and here will be 225 stocks covering a very wide range of forms. The tendency in recent years has been to develop the smaller-flowered types in preference to those which, having very large and heavy flowers, required a great deal of attention in staking.

Those who are interested in vegetables should see the trial of early summer varieties of cauliflower in the Vegetable Trial Ground. These were sown at the end of May in the open ground and planted out in early June. So treated they take about three months to mature and having a fine-grained white head they are being used by commercial growers in place of the older autumn-heading types.

The approach of autumn is signalled by the gradual change of colour in the foliage of many deciduous trees and shrubs as in the older leaves of some evergreens. The normal green pigment of the leaf is contained in innumerable microscopic bodies known as plastids and it is composed of two yellow constituents, carotin and xanthophyll, and two green ones known as chlorophyll. The last-named, although it does not possess all the desirable properties claimed for it by the manufacturers of patent medicines and cosmetics, has nevertheless the more remarkable power of trapping the sun's energy and using it in dissociating the elements of atmospheric carbon dioxide. During the active life of the green leaf carbon is thus made available for use as an ingredient in the synthesis of sugar.

As the leaf ages the green pigments undergo decomposition while the yellow ones often remain within the leaf unaltered and it is to these changes that the gradual yellowing of the leaf is due. In certain genera such as the tulip-tree, *Liriodendron*, and the maidenhair-tree, *Ginkgo*, the leaves display a clear and bright yellow unmixed with any other colour. In certain other genera such as *Liquidambar* and *Rhus* a much richer colouring of red or purple is to be seen and this is in part due to the presence of anthocyanin pigments in the cell-sap.

The formation of the red pigments is held to be associated with the accumulation of sugars in the cell-sap, but it is not an inevitable consequence, for many leaves never colour at all and some of the sweetest of fruits have the least attractive skins.

The intensity and duration of autumnal colouring in English gardens are quite unpredictable, but the best colour seems to follow after a dry summer with some rain during September, whereas after a very wet summer with little sunshine the display is generally poor. It seems that a lowering of temperature during the present month encourages the colouring and even a few degrees of frost may be helpful. A very severe frost such as we sometimes experience about the third week in September may be disastrous and result in early leaf-fall before the colour is well developed.

MASS PLANTINGS IN NATURE AND IN GARDENS

Lanning Roper

THERE has always been a fascination in the way plants grow in vast colonies in the wild. Perhaps the classic example is the heather-clad moorland in parts of England and Scotland, where whole valleys and hillsides are an undulating mass of mauve-purple *Erica cinerea* or *Calluna vulgaris*, the bell and ling heathers respectively. Here they grow to the exclusion of most other flowers. The predominance of this low, wiry, woody shrub, perfectly adapted to its environment of winter gales, acid peaty soil and the depredations of the sheep, gives vast areas their essential character. From this single example, and from many more to be quoted later, the gardener can learn much, and we can see the value of "group plantings" or "mass plantings" as I shall call them for want of a better term in gardens where space permits, though even on a comparatively limited scale.

There is nothing novel or radical about this plea for group or mass planting. Forestry as it is practised with great tracts of larch, Douglas fir, pines or poplars is group planting on a scientific scale. So, too, the cherry orchards of Kent and the plums of Evesham. The bulb fields of Holland with tulips and hyacinths in serried ranks covering vast flat tracts of rich black earth, or the daffodils in the Fen Country are further examples. What then is the difference between these last examples and the Alpine Meadow at Wisley? The former are essentially commercial in their objectives—namely to grow as rapidly as possible bulbs of sufficient size to command a good price in the world bulb markets, and, as a by-product in some localities, to provide cut flowers. As the bulbs are planted in straight lines so that they can be easily cultivated and lifted, their decorative effect is secondary. With the Alpine Meadows at Wisley or at Windsor, suitable species of dwarf daffodils have been planted and allowed to increase for our enjoyment. They are informal in their arrangement and are growing as they would under ideal conditions in the wild. There is a feeling of natural abundance rather than a man-made plethora. The effect is natural and casual rather than geometric and formal.

Other good examples of mass planting include the wonderful display of winter aconites (*Eranthis hiemalis*) at Wyck in Hampshire, the vast patches of self-sown crocuses and snowdrops at Myddelton House (Fig. 112), the carpets of *Anemone blanda* at Highdown, or the plantations of *Rhododendron augustinii* in the Valley Gardens at Windsor where mature plants under collectors' numbers have cross-fertilized and hundreds of young plants in subtle shades of blue and amethyst with endless variations in spotting and frilling of the petals form an unforgettable sight

in spring. So, too, at Bodnant and Exbury there are mass plantings of rhododendrons, camellias and even rare Asiatic magnolias which enable us to have a small comprehension of how these shrubs and trees might grow if left to their own devices in their native habitats and to see not one or two of a given species but a wide range. Trees grown in this way develop a slightly different habit than they do when grown as splendid isolated specimens. Their decorative possibilities are enhanced by their usefulness to the landscape gardener.

This desire for group plantings of a given species or cultivar is not to be confused with mixed plantings of a single genus. That is another conception entirely. We have all seen too many examples of the latter where rhododendrons of wide diversity have been mixed along walks or on sweeping banks. If colours are carefully blended and care has been taken in grouping plants with different habits of growth and contrasting foliage, the effect may be good, but too often we end with a collection of plants, interesting in themselves but presenting a restless clutter of small colour patches where broad masses would have been more telling.

Let us return to a few more examples in nature. One of the wonders of American flora is certainly the vast plantations of that tree which is always known by the simple term dogwood, whether *Cornus florida* on the east coast of the United States or *Cornus nuttalli* on the west. It is impossible to imagine the beauty of these noble trees when their spreading branches are covered with large creamy white flowers, each of which is really a small central cluster of flowers surrounded by four, creamy white, heavily textured bracts perfectly arranged in a cruciform pattern with a tiny notch in the centre of each petal. These flowers all face upwards so that the tree seems to be covered with a cascade of white. In autumn the foliage turns a rich dazzling crimson and there are clusters of brilliant sealing-wax red berries on the tips of the stems well into winter along with the embryonic flowers for the next season, the buds of which are already recognizable. Prospecting visitors should go to the United States in spring to see the dogwood on the hillsides, in country lanes, or sharing valleys along the river beds with the American red bud or Judas tree (*Cercis occidentalis*), a close relative of the European Judas (*C. siliquastrum*). *Cornus florida* has been superbly used for mass plantings along the super highways and throughways, which are being landscaped where possible to sufficient depth on either side so that glimpses of the towns and other signs of urban and industrial life are largely obliterated. In parts of America the native mountain laurel (*Kalmia latifolia*) grows in vast quantities on barren hillsides or as undergrowth in light woodland. It, too, is being widely used for mass effect in national parks and as roadside planting. MR. F. E. FORD in this same issue discusses other natural collections of dominant species in the United States including *Eschscholzia californica*, *Gilia capitata* and *Lupinus benthamii* (Figs. 110, 111).

One of my favourite spots is the wild dune-land in northern France

through which the railway passes a few miles from Calais. Here sea buckthorn (*Hippophae rhamnoides*) is king. Its weatherbeaten black stems with glowing orange berries in autumn and in summer the undulating masses of silver growing out of the darker grey of the dunes are a wonderful sight. Again we have a perfect example of mass planting.

In Spain and Portugal there are the vast areas along the coast given over to wild brooms, cistuses, lavenders and rosemaries, growing in such profusion and in such masses that it is hard at times to realize that they were not grouped by some other hand than nature's. Examples are endless, but as I have just seen the mimosas in Southern Portugal on the road to Monchique and on the Lisbon road north of St. Bras, they too must be mentioned. Here some have been planted along the roads, as excellent work along these lines has been widely practised in Portugal and over a long enough period to produce telling results. Today there are towering mimosas growing as single specimens and fine stands. Others have seeded at the edge of woods and along the river banks and grow as naturally as hawthorns in our hedgerows or willows, by a stream. The feathery piles of gold above their blue-green fernlike foliage among the olive trees, the cork oaks, the eucalyptus and the hillsides of almond blossoms do much to explain the fame of the beauty of the Algarve.

One of the loveliest of native shrubs is the wild gorse (*Ulex europaeus*). In spite of its prickly habit it has many qualities that endear it —the rich gold flowers that appear at the most unlikely moments when other plants are drab and flowerless, its persistence on the brink of windy cliffs and hillsides where it catches the full force of Atlantic gales to say nothing of drenchings of salt spray, and its tolerance of deep drifts of snow, of icy rains and all the hazards of violent weather. Throughout the year there are always a few stray flowers to gladden the dullest, greyest day, and when we see great masses of it in full glory in the spring sunshine our spirits rise although probably not to the same pitch as that inspired by a field of daffodils.

No bulb excites the same emotions as the daffodil in early spring. Sheets of wild crocuses opening as the melting snows recede in the Alps or the Tyrol are a similar experience, but they do not arouse the same nostalgia as the English daffodil. We all have our favourite spots for the wild Lent lily. It may be on the Dorset downs, a meadow in Kent, or a sheltered glade in the Lake District. It matters little as long as we see them naturalized or growing wild in vast quantities in a sylvan setting. The modern giants cannot compare for this particular purpose. A splendid old hybrid of modest size is 'W. P. Milner' which graces many a park such as Howick Hall in Northumberland, where they have been naturalized on a very generous scale.

The Alpine Meadow at Wisley is another astonishing sight when the hoop-petticoat daffodils (*Narcissus bulbocodium*) and *Narcissus cyclamineus* are in full bloom. These delightful dwarf species seed themselves and build up rapidly. The comparatively new Daffodil Meadow in the

Savill Gardens offers us an interesting opportunity to see how rapidly they develop. Few mass plantings of bulbs are more rewarding. I have already mentioned winter aconites. They are capricious, growing superbly in some gardens and failing completely in others, by either disappearing entirely or by sending up masses of foliage but refusing to bloom, looking for all the world like headless dwarfs in frilled green ruffs.

This inexplicable failure of certain plants to naturalize and colonize under seemingly satisfactory conditions is baffling. So often plants which do well in one garden fail in one near by where conditions are apparently identical. Lilies are the arch offenders; about them we will say more later. Various factors are blamed including drainage, soil textures and composition. Some experts believe that it is a lack of certain trace elements; others, that there are tiny bacteria whose presence or absence spell success or failure with certain subjects. Be that as it may, there are so many plants that do naturalize well that it is hardly worth wasting time trying to establish more than a few specimens of the recalcitrant ones. After all, the secret of mass or group planting is that the subjects chosen must flourish and if possible increase virtually unaided. The famous embothriums at Lochinch, which have suckered and seeded near the old castle until there are remarkable stands of them, provide a good example.

Snowdrops in Scotland and in many parts of England can safely be described as sensational. I shall never forget my excitement at seeing great slopes completely covered with them in the grounds of a derelict house in late February after the war. Three of us picked great bunches for a hospital but after several hours there was little indication of our predatory act, so floriferous were they. There are few more effective sights for the dazzling white of the flowers and glaucous green foliage are in perfect harmony and they carpet the ground so evenly and so naturally that one cannot conceive the time when they did not grow there. At Myddelton House near Enfield snowdrops, including the large flowered *Galanthus* 'Straffan' and *G. nivalis* 'Atkinsii', were allowed to seed themselves and today there are great drifts and unexpected pockets of these enchanting bulbs (Fig. 112).

Crocus tomasinianus is a particularly obliging species. It seeds itself so freely that it comes up in and among other plants and is at times even considered a nuisance by certain gardeners. There is a lovely variation in colour, ranging from silvery lilac to deep reddish purple. At Highdown they love the chalk soil and there are vast quantities of them. *Crocus aureus* in the same garden throws a dazzling mantle over the borders in spring (Fig. 116). Later the borders are weeded, dug over and given rough treatment but each year the crocuses are still more numerous. *Tulipa saxatilis* has covered a border over twenty yards in length and is a remarkable sight in April (Fig. 118). These species are a familiar feature in many other gardens and are among the most reliable.

Primroses are another gregarious plant. Their soft yellow flowers

strewn under hedgerows, over railway embankments, in marshy open lowlands, and above all on slopes where trees have been felled and the light let in are the very essence of late March and early April. They grow with such abandon and luxuriance that whole fields and hillsides are studded with clumps of pale yellow. They are one of the most beautiful of all wild flowers, holding their own with even the rarest and most exotic of Asiatic primulas. Cowslips are less common but equally gregarious and fields of them are a lovely sight in May. There are few fragrances more subtle. The late MR. E. A. BOWLES wrote of cowslips: "I believe that if heaven smells of anything it will be of cowslips."

We never think of primroses, cowslips, or for that matter *Anemone nemorosa* as isolated flowers but always as mass plantings. From them we can take a lesson for our woodland and wild gardens. At Windsor in the Savill Gardens there is a very floriferous pinkish mauve primrose, the whole stock of which has been developed from a chance seedling found in SIR ERIC SAVILL'S old garden at Ranger's Lodge. Today there are drifts of it growing as a ground cover under the pale pendulous yellow flowers of corylopsis, tree heathers and early-flowering rhododendrons. They form broad sheets of colour and are far more effective than numerous groups of different coloured varieties. There is no doubt that for underplanting in large gardens it is important to plant an occasional very bold sweep to rest the eye and to serve as a foil for the wide variety of trees, shrubs and taller flowers. Heathers should be similarly used for underplanting and there are many other subjects including *Tiarella cordifolia*, ajugas, pulmonarias and lilies-of-the-valley which are suited. Used in this way they are rather like the broad, sober mat of a framed watercolour or an etching; they enhance and complement but do not vie.

The bluebell (*Endymion non-scriptus*) is another wild flower that loves its own company. There are so many places in England where they carpet the woods and downlands that it would be presumptuous to single out particular ones, but the bluebells at Kew are known the world over and rightly so. Here is mass planting *par excellence* but there are dozens of places where there are comparable displays. Devon, Kent, Shropshire, Dorset, and other counties are justly proud of their beech woods carpeted with blue. Perhaps the woods are of oak and chestnut but the bluebells are the same. There is no exaggeration when we say that the ground is a sea of blue, for blue it is, the distant sheets of flowers merging in the blue haze of a late spring afternoon. Bluebells are so ubiquitous and so persistent that they can even become a menace. In lots of gardens in London where soil is light and dry, bluebells ramp and seed, so much so that our drive looks like a country lane in spring. Not so daffodils, which flower once or twice and then go blind in spite of feeding. This is partly to be explained by lack of moisture after flowering when the bulbs should be regenerating flowers for the following years, but this same drought has no pernicious aftermath for bluebells.

Hellebores are another flower which sows its seed where happy (Fig. 119). It is a wonderful plant for light shade and is handsome in leaf and flower. At Highdown there are hundreds of plants of different species. Writing of *Helleborus foetidus*, in *The Chalk Garden*, SIR FREDERICK STERN says that this species "with green flowers and pleasant narrow foliage, gives some colour in the dull months, but it seeds itself so freely that it is apt to be a nuisance". He goes on to say: "Later the different forms of *H. orientalis* come into flower and are the best value of them all; the seedlings vary from deep chocolate to pink and white. They all enjoy chalk soil and seed themselves freely in half shady places among deciduous shrubs". *H. corsicus* is another lovely green hellebore which seeds freely. At Bodnant it is a great feature on one of the lower terraces where it seeds itself and makes a striking picture combined with the deeply cut foliage of tree paeonies under the shade of arbutus trees. Again at Highdown *H. corsicus* has established itself superbly as has *H. lividus*. A charming hybrid of the two which has been named *Helleborus* × *sternii* is another plant which is equally given to colonizing. At Benton End, in Suffolk, SIR CEDRIC MORRIS also finds that hellebores seed freely and are easy to naturalize.

Paeonia lutea var. *ludlowii* at Highdown has established itself on the cliffs of the chalk quarry and is completely at home, rearing masses of children with seeming ease. In other gardens *Paeonia delavayi* and *P. lutea* behave similarly.

It is worth noting that occasionally plants, introduced with the best of intentions, may prove a terrible scourge. I was recently shown slides of the wild ginger (*Hedychium gardnerianum*) or hybrid of it (Fig. 117), which was introduced into the Azores about a century ago. Its bold leaves and fragrant flowers of yellow and apricot lent an exotic note to the bold, rocky hillsides. Who could have predicted that it would sow its coral-red seeds everywhere and that it would become an almost insuperable scourge, spreading its tough rhizomatous roots in an impenetrable web, blocking streams and clinging to the rocky hillsides in an every-widening span? For us it is an exotic decorative plant suited to only very mild counties or to large pots in a cool greenhouse or conservatory. Yet there in the Azores, where conditions of soil, temperature and moisture are evidently ideal, it is thought of as a dangerous advancing enemy overwhelming all other crops unless subjected to rigorous warfare.

A keen horticulturist who lives there writes, "When Hedychium was introduced I can't tell you exactly but we can be more or less certain that it was between 1850 and 1875. Several of the wealthy citrus fruit growers owned private parks which were, in reality, little less than botanical gardens. These men all worked for botanical institutions in Europe acclimatizing trees, plants and seeds from remote parts of the world. Kew, for instance, constantly sent out seeds to be tried out, with the understanding that Azorean produced seeds would be sent back, the prevalent idea being that Azorean seeds would germinate with less

difficulty in northern climates. According to my Grandfather (born in 1835), who was a personal friend of the men mentioned above, one of them received Hedychium seeds from Kew . . . and a year later the plague was under way, for the not-fully-ripe fleshy seed-pods proved extremely popular with the birds and the seeds themselves were unaffected by the digestive processes. It soon became impossible to hold the plant in check. Before the last War, I was told that the conservative value of the land overrun by Hedychium should be put at between 25 and 35 million pounds *gold*. Not only does the plant establish itself on any sort of land where seeds are dropped, but, if the top soil is at all decent, the root-stocks become so thick and strong that they invade and slowly kill whole woods of well grown pines, *Acacia melanoxylon*, etc., if they happen to be in its way. The plant exists on every single island in the archipelago (Flores & Corvo lie more than 140 miles from their nearest neighbour), rock-pigeons being to blame."

Rhododendron ponticum is a good example of another introduction which in some localities in this country broke the reins. There are areas where a combination of peaty soil, mild climate and copious rainfall have made it thrive and seed so widely that it is as rampant as any indigenous shrub, making it necessary in gardens and parks to root it out unmercifully. I am fond of it, liking its colour and the pleasant variations which occur when it is planted in mass. It is true that it clashes with the reds and scarlets, but that is why it should be planted in masses by itself. For a long woodland walk it is extremely effective, often more so than indiscriminate planting of mixed hybrids. These become a collection of interest but the visual effect is not always attractive in the landscape. On the other hand if sufficiently large groups of a single cultivar or similar ones are planted, a pleasing unity can be established, with homogeneous colour masses in keeping with the scale of the landscape. There is nothing wrong with *R. ponticum* in itself; it is just the fact that it is so often in the wrong place.

There is something arresting about a mass of a single species growing together. In Scotland one is thrilled to see a grove of *R. falconeri* of treelike proportions. The 'Lady Chamberlain' walk at Exbury with scores of plants of *R. cinnabarinum* crosses, similar in habit and harmonious in colour, is of unusual beauty. Massed plantings of rhododendrons of the Triflorum Series such as *R. davidsonianum*, *R. exquisetum* and *R. oreotrephes* make a lovely effect while a slope completely covered with the fine free-flowering hybrid 'Elizabeth' is well-nigh unforgettable. Massed plantings of the various cultivars of the *Loderi* cross are ravishingly beautiful, with just enough difference in the tinting and frilling of the huge individual flowers to make a subtle harmony.

The willow herb (*Epilobium angustifolium*) plays a curious role in the Londoner's affections. By many gardeners it is despised, but to others who remember how it suddenly concealed the gaping cellars and craters of bombed buildings under a mantle of magenta flowers and later fuzzy white seed heads, it is held in some esteem. In the country

in late July or August there are vast colonies of it on hillsides where trees have been cut or forest fires have raged. The great sweep of magenta is lovely on a green hillside and although the colour may not be a favourite it is a good one in the landscape. Willow herb like the common mauve buddleia (*Buddleia davidii*) was the floral phenomenon of the blitz and never was man more grateful for massed plantings which again in this case were God-made.

Lilies offer relatively few examples of massed plantings which have been constant for long periods. Because of their wonderful form and the subtle poise of the individual flowers, lilies are not plants that necessarily need to be seen in mass. A few stems of *Lilium auratum* against a tapestry of foliage are so beautiful that numbers are not required. Yet what is more lovely than a fine stand of madonna lilies in a cottage garden or along a wall where they have multiplied undisturbed for years?

One of the best colonizers is *Lilium martagon* and its varieties. The outstanding example is in the Fellows' Garden at St. John's College, Cambridge, where hundreds of flower spikes are produced each season. It is a remarkable sight and one which many gardeners long to emulate. Martagons are well away in many gardens and one hopes there will be no catastrophes to upset their progress. Lilies, unlike many plants, will not stand up to adversity for long. The number of collections where lilies were successfully naturalized but subsequently lost during the years of neglect in the last war are too numerous to be of happy memory.

At Falkbourne Hall in Essex there is a wonderful colony of *L. szovitsianum* growing in long grass under the spreading branches of a huge plane (Fig. 115). They have been there for over fifty years. During the war they were completely neglected but they have never looked back. In spite of the drought late in June 1959 there were several hundreds of stems, some as much as 6 feet tall and bearing up to twelve butter-yellow flowers. It is difficult to explain their striking success in this garden. There is a moat near by and there is no doubt that some of the plants have sent down their roots to drink, but others grew high up the slope where most of the moisture and the nourishment, I would have thought, would have been absorbed by the hungry roots of the giant plane. Here and there at a considerable distance odd clumps have grown from seed, struggling through the heavy roots of the field. Only at St. Nicholas in Yorkshire have I seen better clumps of this wonderful lily, and those suffered badly during the very wet summer and autumn of 1958.

Of the North American lilies, *L. pardalinum* and the Bellingham Hybrids, which are of allied parentage, have colonized most successfully in some gardens. The latter require breaking up and dividing every three or four years or the flowers diminish, as they suffer noticably from overcrowding. In the Savill Gardens *L. superbum* has also proved excellent for massed plantings. Alas, *L. canadense* which stars the damp meadows over large areas of the United States has always proved

difficult, resisting all attempts at naturalization, although we occasionally see a fine clump or two. We are faced with the fact that lilies are not easy in the climatic conditions of the British Isles. We can grow them, but naturalizing them, save for a few species, is another matter.

Prunus 'Kanzan' has always been considered an awkwardly shaped tree though its spreading ascending habit makes it ideal for roadside planting, so much so, in fact, that it has come to be associated with small suburban villas and by-passes. Now and then we see a very old tree which has lost this habit or one which has been weighted at the ends of the branches when young to alter its shape. SIR ERIC SAVILL has planted an entire slope in the Valley Gardens with this cultivar and the effect promises to be most striking, recalling the great sweep of *Prunus sargentii* on the slopes of Breakheart Hill above Johnson's Pond in a setting of beech and larch. Flowering cherries are much more lovely where a quantity of a given kind is used for bold effect rather than a combination, as the diversity of habit, of flowering time and of foliage texture are prone to create a spotty effect.

The famous cherry trees in Washington, D.C., which people travel so far to see, are entirely plantings of *Prunus yedoensis*. The long lines of old spreading trees covered in pale pink blossom mirrored in the waters of the Potomac Basin are spectacular and beautiful in the simplicity of the conception.

Much more is being done at Windsor with this idea of group planting. A section devoted to cultivars of *Rhododendron loderi* has already been planted as have plantations of *Magnolia soulangiana*, *M. sargentiana robusta*, *Prunus* 'Accolade' and *Cornus florida*. Avenues of American hickories are in a sense massed plantings and will be a welcome change from the usual avenues of lime, beech, chestnut and plane.

It is in projects such as this that the Gardens in Windsor Great Park have an advantage. Unlike official botanic gardens it is not necessary to have complete collections of different genera. Trees and shrubs can be massed for decorative effect and repeated as necessary. Never does the right plant for a certain position have to be ruled out because it is already well represented. The new Heather Garden, the glades of candelabra primulas, the impressive colonies of exquisitely delicate erythroniums and dwarf cyclamen all bear witness to this principle though using flowers of a smaller scale.

Similar tenets were followed at Westonbirt, and these have helped to make it one of the most beautiful arboretums in the world. It is true that the collection is tremendously varied and very rich in specimens but it is the broad glades and sweeping rides lined with bold groupings of trees and shrubs of contrasting habits, textures and colours that are memorable. It is the sun in October gleaming through hundreds of brilliantly coloured Japanese maples that we cannot forget or the clumps of *Cercidiphyllum japonicum* which resemble fountains of mauve and apricot and gold. No, it is not a garden of specimens. It is a *tour*

de force of planning and of mass planting for effect, with single superb specimens as accents. It is the brilliant juxtaposition of conifers and deciduous trees that gives variety and effectiveness the year around.

THE SMALLER GARDEN—VII
WHITE LODGE

Hilda Davenport Jones

IN 1934 the garden was a rectangular field on a gentle southern slope, overlooking the valley of the Kent Ditch, a stream which is the boundary between Kent and Sussex. The house in the extreme north-west corner and being at the highest place, overlooks the whole garden. The slope is steepest in front of the house so that three small terraces had to be built. The house stands on the main terrace and seems to merge from the green of grass, for grass covers the terraces, falls as a lawn to the south, and to the east rough grass with bulbs surrounds an old oak. Beyond is a shrub boundary screening the frame yards for pot plants and nursery. Below this, informal plantings lead to the main grass path that leads from the house and terraces. The soil is heavy, in some parts very heavy, with patches here and there of really lovely workable loam.

The terraces get the protection of the house and full south exposure, making conditions suitable for plants that need a little shelter. Lists of plants are rather tedious, but some that have done well here might be of interest.

Grevillea sulphurea flowers over a tremendously long season from March onwards and is attractive to bees. It is 7 feet high and 9 feet through. Because the evergreen foliage frequently catches the heavy snowfalls here, it has been found best to cut out the old branches which tend to split, and encourage young, wiry growth. *Callistemon linearis*, some 6 feet high, not only flowers very freely but has several self-sown seedlings around. *Hypericum* 'Rowallane' is far better here than in the open garden and gives a succession of its wonderful great flowers from June onwards. *Hypericum keniense* has so far been badly cut each winter, only having produced a few of its curious twisted crimson-backed flowers.

The walls are covered by such evergreen climbing shrubs as trachelospermums; *T. asiaticum* has a delicious heavy scent, particularly in the evenings; *T. japonicum* crimson bronze winter foliage, and the superb ceanothus, 'Cascade', which has unusually long and graceful sprays of bright blue flowers over an extraordinary long period, from May to June.

The lowest terrace has only a 3-foot retaining rock wall; the small

border at its foot is not only very sunny but keeps fairly moist, making a useful place for growing agapanthus, watsonias—a pink and a tall growing scarlet species, perhaps *W. stanfordiae*—the tall *Gladiolus purpureo-auratus* with queer cream and grey hooded flowers and *Yucca filamentosa* var. *concava* always handsome in foliage and which occasionally sends up a great flower spike. Also that magnificent *Euphorbia wulfenii* has seeded into hot dry cracks in the wall where it does splendidly.

At the end of this little wall, to continue the protection it gives, a few shrubs have been added. *Elaeagnus* × *ebbingii*, an evergreen, absolutely hardy and dense growing, is the perfect windbreak and the flowers very sweetly scented in October.

On the flat terrace there had been an attempt to grow tall bearded iris, but this failed. So the long narrow borders have been turned into a quite successful place for growing alpines and very small shrubs. The centre of these beds has been raised about 9 inches by building a tiny wall with roof tiles laid flat one on top of the other. This raised plateau has the necessary drainage to grow some of the little tufted plants such as *Douglasia vitaliana*, *Dianthus* 'la Bourbrille' *albus* and *Asperula arcadiensis*. *Campanula* 'Lynchmere' trails over the edge, *Hypericum trichocaulon* (Fig. 126) recently collected from Crete and *Oenothera acaulis* hang down the southern wall, while *Primula marginata* and saxifrages do well on the north side. Against the little wall *Punica granata nana*, a very dwarf pomegranate, and *Linum* 'Clabranii' and other little shrubs are planted. *Gentiana verna angulosa* is happy on the flat. The whole of these rock beds are covered with a top dressing $\frac{3}{16}$ inch crushed beach and a few rocks and stones.

From there the main grass path leads straight down the garden between wide borders planted with quite a collection of lovely Old roses and a few interesting perennials such as the white, double and the striped forms of *Geranium pratense*, *Allium rosenbachianum*, *Clematis* 'Mrs. Robert Brydon' and *C. integrifolia*. The border is edged with *Mentha rotundifolia variegata* (the pineapple mint) and Pinks 'Brympton Red', 'John Gray', 'Benton Green Eye' and others. An uncommon toadflax here is *Linaria dalmatica* with attractive glaucous green foliage and slender, 3-foot-high spikes of clear yellow flowers, the perfect foil for old roses.

These more formal straight-edged borders are left behind after the path passes under an arch of *Wistaria multijuga* with its long grey blue hanging racemes. From now on paths wander about among trees and shrubs underplanted with woodland and bulbous plants, the house is hidden from view and there is a feeling of complete privacy. No attempt at landscape or planting for effect has ever been made, but the planning has been to create as much protection from wind as possible. A backbone of pines underplanted with *Rhododendron ponticum*, has been arranged down the centre of one long bed, and another with *Cryptomeria japonica* 'Elegans' and stransvaesia, and nearer the formal borders

escallonias have been used. These sheltering groups run roughly north to south to give the maximum shelter from the south-west gales, and also even more important in this area from the east winds often prevailing for long periods in the spring and early summer which do such damage to the young growths. The difference these shelters make is enormous and their planting has been well worth while.

A further advantage of this arrangement is that sites for shade and sun or, in fact, any desired aspect can be found.

A few magnolias have been planted in the lower part of the garden where their large leaves are less likely to be damaged by wind. *M.* × *veitchii* has grown into a splendid specimen 30–40 feet high with hundreds of huge soft-pink flowers every spring. *M. kobus borealis* grew quickly into a graceful little tree and not only flowers very freely in spring but the leaves turn soft golden brown in autumn. Both these magnolias were layers and, as the result of this, started to flower as quite young plants. The summer-flowering *M. sinensis* grows quickly to a good height from where the beautiful scented flowers can be seen looking downwards, and later the very decorative fruits hanging.

In the shadier positions a good many of the smaller-leaved rhododendrons have been tried. The white *R.* 'Bric-à-Brac' and lovely pink-flowered *R.* 'Cilpinense' flower in March, also *R. leucaspis*, now a dense bush 2 feet high and 4 feet through, *R. moupinense* and the F.C.C. form of *R. lutescens* with reddish-bronze young growth and exquisite yellow flowers. No rhododendrons with larger leaves than those of the *Cinnabarinum* and *Triflorum* series have been planted, as in this garden true woodland conditions do not exist. *R. williamsanium* has grown into the most perfect rounded dome 8 feet across and 4 feet high. Every May it is a lovely sight with its shell-pink flowers, followed by the handsome bronze young foliage.

Every kind of epimedium and vancouveria obtainable has been planted under shade-loving shrubs, also heuchera and tiarella species, hepaticas, and *Adonis brevistyla* with white anemone-like petals with blue reverse. *Anemonopsis macrophylla*, a Japanese woodlander, has grown well in rather heavy soil. Astrantias are particularly attractive in these surroundings. Amongst them is the small-growing *A. carniolica rubra* with deep red flowers.

Cyclamen neapolitanum is seeding about and its beautifully marked leaves carpet the ground through the winter. One bed under a walnut tree is kept for the white form and is a very lovely sight. They are interplanted with green-leaved forms of ivy which protects them and seems to encourage particularly large, beautifully marked leaves.

It was noticed that hellebores were very happy here, so a great number of seedlings has been raised. After several generations of *H. niger* a very large, pure white flowered strain was obtained and named 'Potter's Wheel'. Also two very interesting looking *H. niger* seedlings were picked out and these grew rapidly into the large and lovely hybrid *H.* × nigricors. They have the stout stems and flower heads of *H.*

argutifolius (*H. corsicus*) but the pure white flowers of *H. niger* though much flushed with green. The leaves are large, deep green and very handsome.

It has been found that *Fritillaria pallidiflora* (Fig. 127) and *F. gracilis*, of which one planting is now 3 feet by 3 feet, grow well in light shade, but the soil must be made up with extra leaf-mould and grit as they need good drainage. Groups of these among the small woodland plants are very lovely with, in more open positions, the taller *F. pyrenaica*. *Arisaema candidissimum* has a flower like a large white arum and likes growing in the same conditions.

Many other shade-loving plants are grown and new ones are being added all the time.

Tree peonies start growing so early in the spring that they have been planted as far as possible in positions where they are shaded from early morning sun, to lessen the danger of damage by quick thawing after frost. The gorgeous flowers of *Paeonia suffruticosa* are in shades of rose and pink with dark maroon centres, but the loveliest is the pure white, the golden stamens shown up by the dark centres.

Another tree peony of fairly recent introduction is *P. lutea ludowii* from Tibet with sulphur yellow flowers. Here it grew very rapidly soon reaching 8 feet in height and 14 feet across. It is a magnificent foliage plant as well.

Also from one of the last expeditions to Tibet came seed of *Euphorbia griffithii*. The seedlings varied considerably in brilliance of colour, one plant being quite outstanding with flaming crimson and scarlet bracts. It has grown to about 4 feet high and remains in colour for several months in the spring.

In a sunny sheltered corner *Mahonia lomariifolia* has become a very fine shapely bush, quite 8 feet tall and 6 feet through. It tends to grow tall and straggly when planted in too much shade. Perhaps this plant was cut by frost when still in its young formative stage. It is a cheerful sight in November and the foliage is always attractive but particularly in spring when the young growth is bronze (Fig. 125).

Rubus 'Tridel', a most beautiful shrub raised by CAPT. C. INGRAM, is growing in a fully exposed position and now is quite 12 feet high and 14 feet across. The arching branches bear the large pure white flowers all down their length in one outburst in May.

One border is proving of great interest. It is very sunny and sheltered, the soil is full of pine roots, and always fairly dry. In these starved conditions are being tried those Mediterranean plants that are inclined to grow too lush in the ordinary soil and so fail to survive the winter. *Cistus populifolius* var. *lasiocalyx* has grown here for years and looks so entirely at home in these surroundings that it suggested the idea of gathering together plants of a similar climate; the smaller-growing cistus, such as *C. crispus*, *bourgaeanus*, *revolei*, *lusitanicus*, × *verguinii* and the really lovely hybrid 'Paladin'; *halimium*, *dorycnium* and amongst them a few *Lavandula stoechas* and *L. lanata*, also seedlings

of that rather difficult *Helianthemum tuberaria* were pricked out in a group and look well. *Lithospermum rosmarinifolium* is in the most starved spot shared with a particularly tender rich blue-flowered rosemary. The autumn gales bring down a covering of pine needles and for extra protection handfuls can be thrown over any specially tender plants. The ophrys and some orchids produce tender young leaves in winter, and here the light covering of dry pine needles saves them from damage. Most of these shrubs are evergreen, and with *Arbutus unedo rubra* and *Erica australis* and *E. arborea*, the effect of such varying shades, shapes and textures is extraordinarily pleasing and interesting the whole year round.

Furthest from the formal borders is the scree garden. To avoid too abrupt a transition in size from trees and large shrubs to the very small plants grown here, groups of half-moon shaped beds encircle it. These long semi-circular beds are banked up in the centre, and their gentle slopes of different aspects are very satisfactory to plant. Prostrate junipers look very well growing down a slight incline and heathers particularly attractive on uneven ground. The shady sides grow ramondas, the dwarf *Rhododendrons radicans*, *microleucum*, *sargentianum*, with little ferns between, or *Primula marginata* forms and saxifrages The sunny slopes are ideal for genistas, moltkias and astragalus. There are a great many small plants that do not need to be grown in scree, but are out of place or likely to get lost in larger borders. The different forms of the celandine, the double and the copper coloured, and pulsatillas of soft pink, white, deep purple, red and the little native one. There is a suitable place here for the small daffodils from Spain and Portugal. These beds are the perfect surroundings for the scree and make this part of the garden very attractive and interesting.

The screes slope gently to the south. Many little bulbs are grown here. *Crocus cambessedesii* tried out in a warm corner dwindled away, but *C. corsicus* increases, and *C. banaticus* does quite well. *Romulea bulbocodium* and also its white form grow well, but *R. clusii* disappeared after setting seed. *Fritillaria graeca* and *F. acmopetala* like the sun and drainage and more fritillaries raised from seed are about to be planted here. An unnamed yellow-flowered bulb from Basutoland has seeded about and has proved quite hardy. *Muscari macrocarpum* flowers freely but does not increase; its clear yellow flowers are always a surprise to visitors. Under a large *Cupressus wisellii* the winter flowering cyclamen are established and spreading their bright colours everywhere. *Galanthus elwesii* prefers this well drained scree mixture to the natural heavy soil, and *G. ikariae* the late form, has increased tremendously in the shade of a *Juniperus squamata meyeri*. *Leucojum autumnale* is perfectly happy and sends up its dark red flower stems even in the drought of August. Some of the small alliums from the mountains need moister conditions and richer soil to be grown successfully; these include the blue *A. sikkimense*, the soft pink *A. mairei*, the magenta crimson *A. amabile*. They can be lost very easily in too dry conditions. But *A.*

flavum nanum, *A. ostrowskianum* need dry sunny places and *A. narcissiflorum*, one of the most beautiful of all, is easily contented. *A. callimischon* has a curious habit. It grows vigorously early in the year making its flower spikes, then dies down completely, leaving the dried up spikes for months, until in September suddenly there appear little white flowers powdered with dark spots. Other plants in the scree are two American violas, *V. nuttallii* (Fig. 124) and *V. sagittata*; they like the good drainage and sun. Some daphnes do very well with added leaf-mould and stones shading their roots; *D. rossettii* evergreen, *D. thauma* evergreen with long tubed pink flowers, and four forms of *D. cneorum*, the white, very small and flat growing, the dwarf pink (Fig. 124) and the lovely little one from the Pyrenees. The largest form is *eximea* which set a quantity of seed one year. *D. glomerata* from the Caucasus has survived here, but does better in a very shady place in leaf-mould.

Verbascum spinosum and *Eriogonum ovalifolium* have grown here for years in particularly hot dry positions. Near them is *Arabis cyprica*; in this case with particularly attractive pink flowers over a neat compact hump in February and March. Many more little bulbs and plants grow here.

The scree was made by taking out about a foot of soil, filling in with rotting leaves, then turves and over this a mixture of crushed beach and leaf-mould. There is a top dressing after planting and subsequently annually, of finely crushed beach ($\frac{3}{16}$ inch). Mounds of scree mixture are made here and there for plants which require extra sharp drainage.

Lathraea clandestina, that curious parasite with lovely violet flowers, was introduced in a spadeful of soil in which it had been growing, and established on the roots of a colony of *Salix vitellina* var. *britzensis*. The parasite has spread yards away but the host plants are now looking rather poorly.

During October and November the autumn colours show up well against the evergreen background. *Acer griseum*, crimson and scarlet, also has handsome peeling bark; *Photinia villosa*, soft shades of golden crimson, is a particularly shapely little tree; *Rhus cotinoides*, flame and orange, is a large quick-growing plant; *Rhus potaninii*, now rare in its native North America, a tree that goes an unusual shade of pink. Smaller growing are the brilliant fothergillas, orange and scarlet, and *Euonymus alatus* vivid crimson-lake.

Elsewhere amongst other trees, *Eucalyptus gunnii* is now a tree of 50 feet with several trunks, and *E. coccifera* with silvery young growth, branches from ground level with almost the habit of a giant shrub.

Part of the garden is set aside as a small nursery where the plants growing in the garden can be propagated and grown on for sale. The frames used for striking cuttings are small, shallow sun frames filled with powdered pumice which is considered much sharper than sand and has proved satisfactory over many years.

Many seeds are sown every year. They are sown in 5-inch pots with a great deal of drainage, each pot is covered by a lid cut out of asbestos,

then they are plunged in ash outside. Here they get frozen in the winter —this is thought to be a help to germination.

The first sowing is made in June and early July, of all those seeds already collected such as the little narcissus species, hellebores and most of the fritillarias. No more seeds are sown until the winter when the rest of the seeds have been collected and received from other sources. Many private gardens and the Royal Botanic Garden, Edinburgh, have been most generous. The British Museum has been most kind in giving seeds from their Tibetan and Nepalese expeditions.

One really outstanding berberis was raised from one such expedition, three seeds were received and only one of these three was in any way remarkable. This turned out to have most striking blue grey foliage and silvery young branches. The flowers are soft pale yellow and rather small, the berries dark and not decorative but the autumn colouring is lovely. Recently the very small *Rhododendron lowndesii* has been raised and flowered.

Several expeditions have been subscribed to and very interesting bulbs have been sent back and are being established. These join a collection of other small bulbs which are grown in cold frames. Here little bulbs that flower very early in the year or are just not hardy enough to grow out in the open are grown. They are given as much light and air as possible to keep them in character, and avoid that drawn-up look which so easily spoils bulbs grown under glass. These bulb frames give an enormous amount of interest and pleasure during the first three months of the year, just when gardeners need a little encouragement.

In these ways, by seed raising and propagating, a large collection of very many different kinds of plants has been made. There is always something of interest throughout the year.

THE SHAPING AND PRUNING OF FRUIT TREES

A. P. Preston

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(*Lecture given on April* 20, 1960, MR. T. NEAME, V.M.H., *in the Chair*)

IN the orchard and fruit garden few cultural measures affect growth and cropping so markedly as does pruning. During the early years the main reason for pruning is to select and train framework branches, but sooner or later many laterals, not required as branches, must be either thinned out, left unpruned, or shortened. Over the years many different pruning methods have been advised. There is probably no one "right" pruning method. Ideally pruning should be intelligently

adapted to different varieties and, perhaps even more important, to local growing conditions. Before considering some of these methods I must emphasize, as would anyone coming from East Malling, the fundamental importance in tree fruit-growing of clonal rootstocks. Since the rootstock largely controls tree growth, fruiting, and ultimate tree size, much of the labour of pruning can be reduced by deciding before planting what final size of tree is required and selecting the root stock accordingly.

Fruitgrowers' requirements in respect of tree shape and pruning method differ according to whether production is extensive, using a relatively small number of trees per acre, or intensive, using a small area of land densely planted. The extensive grower requires trees that can be managed cheaply, with the minimum of detailed work, yet trees which are capable of bearing heavy and regular crops. He may be prepared to see a proportion of his fruit down-graded as culls, provided that the better grade fruit has been produced cheaply enough. As far as pruning is concerned his aim should be to adopt that shape and pruning method which will make least demands upon his workers; in short, he wants a labour-saving tree. The intensive grower, including the private gardener, normally plants a large number of small trees close together. Commercially, he must ensure that a high proportion of his fruit, if not all, reaches the top Fancy grade, thus making a high price to offset the low total crop from a small area of land. His main problem is to select a tree shape and pruning method which will enable him to maintain his trees closely spaced and in regular production.

For convenience, I shall deal with tree building, different tree shapes, and subsequent pruning methods, separately, but of course they are all part of tree pruning in its widest sense.

TREE BUILDING

To ensure that branches arise and develop in the desired positions for the various tree shapes considerable skill is required and many techniques are now in use. A couple of examples will indicate their diversity.

Notching. Varieties differ in their response to the notching technique above buds which are sometimes needed to form framework branches (PRESTON, 1949); the majority tested reacted favourably but 'Worcester Pearmain' was outstandingly poor. However, many notched buds on 'Worcester' which failed to grow out in the first season did so in the second without further notching. When notching, which is usually done just before the buds break, it is essential to remove a crescent-shaped piece of bark just above the bud—a single knife incision is usually not sufficient (Fig. 120A).

Wide crotch angles for primary branches are essential if branch breakage is to be avoided later on. Breakage of only one such branch might reduce the potential cropping area of a tree by one-third. Crotch angles appear to be governed by the downward flow of a hormone produced in the leaf. The more young shoots with leaves that there are

FIG. 110—A mountain slope with a vast naturalized planting of *Lupinus benthamii*, *Eschscholzia californica* and *Gilia capitata* (see p. 413)

Photos: Frank E. Ford

FIG. 111—A series of slopes colonized in early spring solely by *Eschscholzia californica* (see p. 413)

FIG. 112—*Crocus tomasinianus* and various snowdrops at Myddelton House, near Enfield (see p. 382)

Photos: J. E. Downward

FIG. 113—Daffodils beautifully naturalized at Green Lane Farm, Chertsey

FIG. 114—*Primula pulverulenta* which has seeded itself in vast quantities at St. Paul's Walden Bury

FIG. 115—The beautiful yellow *Lilium szovitsianum* at Falkbourne Hall in Essex which have grown undisturbed for decades (see p. 389)

Photo: Sir Frederick Stern

FIG. 116—A remarkable border of *Crocus aureus* and *C. tomasinianus* at Highdown (see p. 385)

Photo: Vasco Bensaude

FIG. 117—Hedychiums in the Azores, covering vast tracts of rocky hillside (see p. 387)

FIG. 118—*Tulipa saxatilis* at Highdown, an unusual stoloniferous bulb which has travelled underground for many yards (see p. 385)

Photos: Sir Frederick Stern

FIG. 119—Seedlings of *Helleborus orientalis* which increase each year in the chalk at Highdown (see p. 387)

FIG. 120—(*A*) One-year-old shoot showing a notched bud. (*B*) Open-centre tree after double-heading, note wide crotch angles. (*C*) Delayed-open-centre tree, the centre leader will be tipped and another tier of branches secured in addition to maintaining a centre leader

(see pp. 398–9)

FIG. 121—Part of a Dutch plantation of 'Cox's Orange Pippin', 'Jonathan', and 'Golden Delicious' trees grown as Free Spindlebushes

(see p. 401)

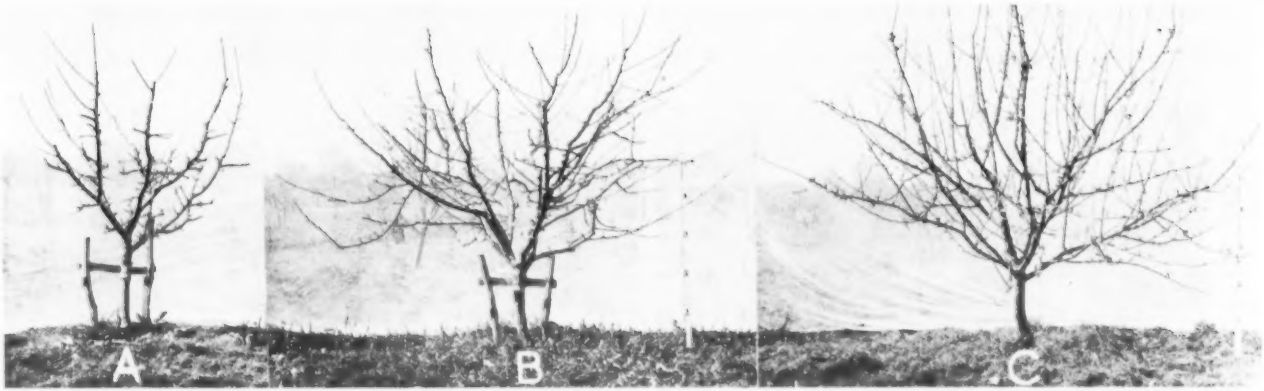


FIG. 122—Seven-year-old trees of Worcester Pearmain on M.IV. (*A*) Open-centre, established-spur-pruned. (*B*) Delayed open-centre, established-spur-pruned. (*C*) Regulated or natural habit. The centre leader in the delayed open-centre tree has been cut back into three-year-old wood to a framework branch (see pp. 404–5)

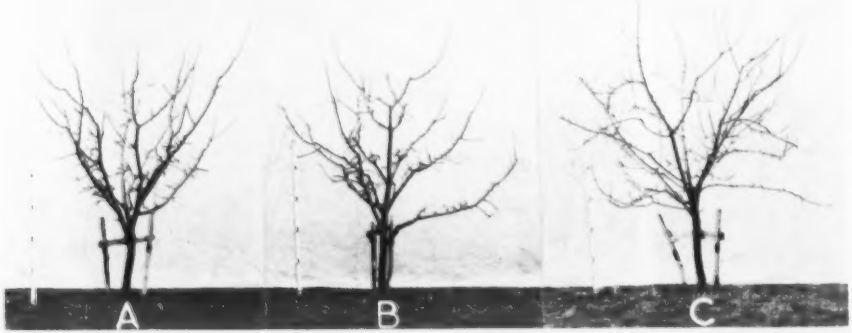


FIG. 123—Seven-year-old trees of 'Cox's Orange Pippin' on M.II before being allowed to carry their first crop. They were de-blossomed each year and they show the effect of three degrees of pruning on tree size without the interacting effect of cropping; (*A*) medium-hard pruning, (*B*) light, (*C*) very light

Photos: East Malling Research Station

Photos: H. Davenport Jones

FIG. 124—The dwarf form of *Daphne cneorum* and *Viola nuttallii* in the scree (see p. 396)

FIG. 125—*Mahonia lomariifolia* in a sunny sheltered corner (see p. 394)

FIG. 126—*Hypericum trichocaulon* recently collected from Crete (see p. 392)

FIG. 127—*Fritillaria pallidiflora* growing in light shade (see p. 394)

above a given bud the wider will be the angle of the shoot developing from that bud, the hormone stimulating the top side of the shoot to grow more than the lower side thus forcing it into a more horizontal position. Notching therefore interferes with the downward flow of hormone to the bud and notched buds tend to produce narrow angles, a disadvantage to be weighed against the advantage of getting a branch in the right position.

Double-heading. A simple practical method useful for standard, half-standard and bush apples, pears and plums, is double-heading. This aims at providing many leaf-bearing shoots to help produce wide-angled branches below. The tree is headed-back three buds higher than finally required and all buds are allowed to grow out without notching or restriction in number. When the shoots are 4–6 inches long the tree is reheaded, removing the piece of trunk bearing the first three shoots, which will usually be the narrow-angled ones, leaving the fourth shoot, having a wide angle, as the new "first" shoot (Fig. 120B). The treatment needs modification for a centre-leader or delayed open-centre tree where the leading upright shoot should be retained and the next two narrow-angled shoots removed, but again this should not be done until the shoots have grown 4–6 inches in length. Having thus secured the primary branches, shoots below the lowest one may be pinched back.

TREE SHAPES

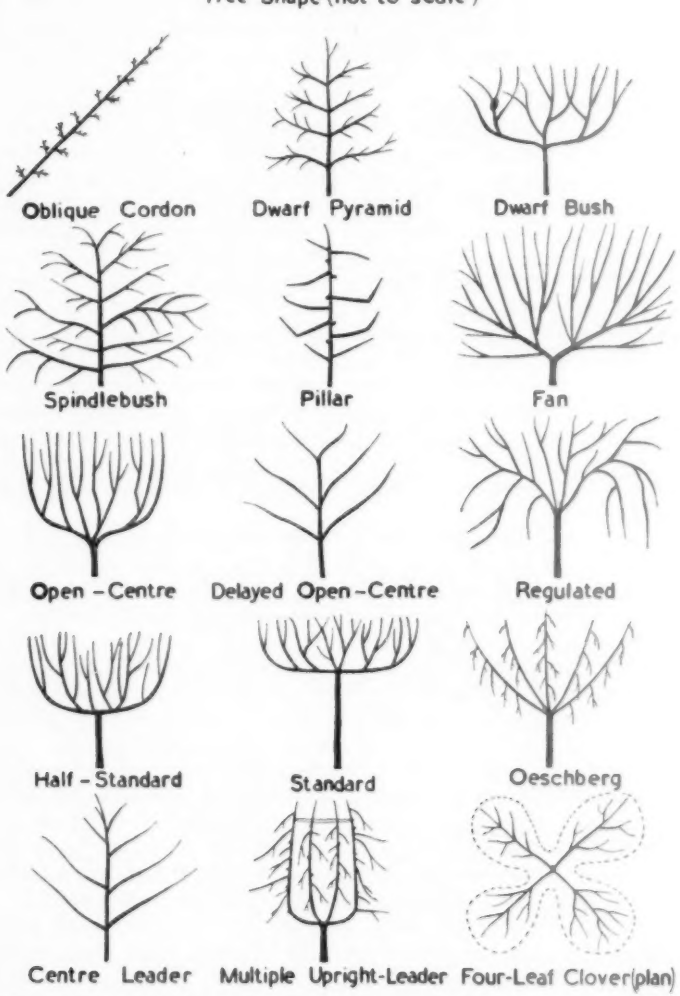
For Intensive Plantations

To succeed with an intensive form of fruitgrowing it is essential to restrict tree size (Text Fig. 1). Assuming that a suitable rootstock has been chosen—further restriction in growth may be secured by planting the trees close together, by drastic tree shaping, and by summer pruning. Grassing-down may also help.

The *oblique cordon* is perhaps the most familiar method of intensive fruit production, particularly in private gardens. The oblique form was developed to overcome defects found in growing upright cordons. As a result of the high capital cost involved in erecting uprights, cross wires and canes, this method is rarely used in commercial holdings nowadays. There seems to be little difference in growth and cropping whether the cordon faces northwards or southwards. Of more importance is that the leading shoot should not normally be pruned, except with a few varieties such as 'Worcester Pearmain', which is liable to give lengths of bare wood without fruiting spurs unless it is lightly tipped to force the buds into growth. The rows should not be narrower than 6 feet apart, but the trees may vary from 30 inches to 3 feet apart according to soil type.

The *dwarf pyramid*, when grown on a semi-dwarfing rootstock such as M.VII or MM.106 rather than the dwarfing M.IX, can stand without staking and tying so that the capital cost of establishment is considerably lower than in the case of cordons. In shaping the dwarf pyramid care is needed to maintain a strictly pyramid shape. The growth of the

upper branches must be suppressed to allow light to reach, and help the development of, spurs and fruits on the lower ones. Failure to do this



TEXT FIG. 1—Diagrammatic representation of some tree shapes used in intensive fruit growing.

often results in poorly developed and unmanageable trees. To restrict growth and to maintain shape, summer pruning is generally done on

both cordon and dwarf pyramid trees. Dwarf pyramids usually need 6–7 feet between rows with the trees 3–4 feet apart in the row.

The *dwarf bush* is treated in the same way as the open-centre bush (see below). In fact, the only difference is in the matter of rootstock selection. Dwarf bushes are grown on a dwarfing rootstock, usually M.IX, thus enabling them to be planted close together either at 10 or 12 feet square, or in hedgerows fairly close together in rows spaced for whatever form of mechanical cultivator is used. Unlike dwarf pyramids on M.VII, dwarf bushes on M.IX require staking and tying, but against this cost may be set the advantage that summer pruning is unnecessary so that pruning may be spread over a longer and less busy period.

The *spindlebush* (FEY & WIRTH, 1944) has several features in common with the dwarf pyramid, but the spindlebush is larger, its laterals are tied down horizontally, and it is not summer pruned until about the tenth year. On the Continent M.IX rootstock was originally used, but the use of M.VII and MM.106 is increasing. The spindlebush is as early bearing as the dwarf pyramid, beginning to crop in the second or third year. The planting distance is about 10 feet square or, for garden work, slightly less. Stakes are driven in before planting and stand 6 feet out of the ground. The tying down of shoots into a horizontal position is laborious, though once they have become woody they remain in position and retying is unnecessary. On mature bushes old fruiting wood is cut out from time to time and a young lateral is tied down horizontally to replace an old one. An excellent translation of the original German paper appeared in the *R.H.S. Fruit Year Book for 1950* (GOLDSCHMIDT & DELAP, 1950). A modification of FEY & WIRTH's original spindlebush has been introduced by the Dutch. They call it the *Free spindlebush*. The essential differences are in the omission of summer pruning and tying down of laterals. Varieties that are precocious are chosen so that the weight of an early crop secures the horizontal position of the branches rather than relying upon metal clamps and string ties. There are now many plantations of free spindlebushes in the Beveland area of Holland where the varieties 'Jonathan', 'Golden Delicious' and 'James Grieve' succeed well, but 'Cox' only moderately so, due to its habit of sending up strong upright laterals from the horizontal branches (Fig. 121).

The *pillar* tree was developed by MACLEAN (1948) in Berkshire as another method of growing apple trees in the form of hedges. Originally it was intended as a strictly intensive form of fruit-growing, but since the recent recommendation to plant the trees 5 feet apart in rows 12 feet apart, the method may be better classified as semi-intensive, involving some 600–750 trees to the acre. The mature pillar tree consists of a central trunk 12 feet high from which one-, two- and three-year laterals radiate. These laterals are pruned on the renewal principle. One-year laterals are thinned out and left unpruned, the number depending upon the vigour of the tree; the terminal growth at the tip of each two-year

lateral is removed; the following year these laterals, now three years old, are stubbed to within ½ inch of the trunk to supply more one-year laterals.

The *fan* shape is commonly used for stone fruits trained against walls. This is a highly specialized form of fruit-growing and the method advocated by WOODWARD (1947), and practised so successfully by him with outdoor wall peaches at Barham Court in Kent, is perhaps the best. From a short trunk two main branches are selected on opposite sides. It is on these two main framework branches that other branches are trained to a fan shape, gradually filling in the centre of the fan from either side. WOODWARD's shaping results in easier management compared with the centre-leader shape with its branches radiating fan-wise. The centre-leader form, so commonly seen in gardens, needs drastic heading back of the dominant central branch when it eventually reaches the top of the wall. This cutting usually results in an embarrassing flush of growth at the top of the tree and the lower branches fall off in vigour.

For Extensive Plantations

The height at which the lowest branch is required governs the nomenclature of many of the more familiar tree shapes seen in our orchards. For example, most apple and pear trees nowadays are grown as *bush* trees with trunks varying in length up to 3 feet before reaching the lowest branch. Some apples and most sweet cherries are still grown as *standards* with trunks 5 or 6 feet high. Plums, generally, are grown as *half-standards* with trunks 4½ feet high. An interesting experiment in the U.S.A. was carried out by CRANE (1928) who headed back apple trees to different heights in multiples of one foot. He found that the longer the trunk the smaller was the head of the tree. The low-headed trees made not only more shoot growth and a larger increment in trunk girth than did the higher-headed trees, but as a result of this greater growth they had a larger potential bearing surface. The height at which trees are headed-back may be influenced, rightly or wrongly, by other factors; for example, if permanent trees are to be interplanted with short-term fillers it might be considered desirable to head-back the former somewhat high to accommodate the latter. Again, in a cherry orchard, where the land may have to be shared between the fruit crop and another enterprise, low-headed trees would be impracticable where sheep are to be grazed—but where the "iron-sheep" is used, namely the gang-mower, low-headed trees may be satisfactory.

Bush trees of both apple and pear include a wide range of shapes in which the design of the framework branches is in most cases the result of severe restrictive pruning practices. Two shapes commonly used at present are the *open-centre* and the *delayed open-centre* (Fig. 120C). The primary branches of the open-centre tree are generally selected in one year and arise fairly close together on the trunk. In later years other branches are selected to fill in the tree's framework, this being kept

open and bowl-shaped by the removal of shoots and branches from the centre. The delayed open-centre shape would seem to be the logical development of the *centre-leader* tree which has been more popular in the U.S.A. than in Britain. The aim with both these shapes is to improve the spacing of the framework branches compared with the open-centre shape. The delayed open-centre tree anticipates the severe dehorning which eventually follows upon the use of the centre-leader. Unlike the open-centre the primary branches of the delayed open-centre tree are selected in successive tiers around a central leader over a period of years. When sufficient branches have been formed the central leader is cut back to a strong framework branch. This delaying of the opening of the centre provides the name for this shape. In forming the delayed open-centre tree it is essential not to allow the framework branches to fork, as is usual with an open-centre; otherwise difficulties may arise in getting into the tree when spraying, thinning and picking. This shape is usually referred to as a *modified-leader* in the U.S.A.

Another shape which is becoming popular in Britain, largely as a result of experimental work and experience at East Malling, is the *regulated* tree. This is best described under pruning methods; nevertheless it warrants inclusion when dealing with tree shapes since it is sometimes referred to as the *natural habit* tree (Fig. 122C). Although it has been used for many years on the very vigorous triploid apple, 'Bramley's Seedling,' only recently has it been used on a large scale with weaker varieties such as 'Cox's Orange Pippin'.It is perhaps the nearest approach to the labour-saving tree that the grower needs, since it does not require restriction to an artificial shape and needs no detailed pruning.

An apple-grower in Ohio developed the so-called *four-leaf clover* pruning system. The trees are trained into four quarters, two open channels being maintained at right-angles through the centre of the tree. The early shaping is similar to that for a modified-leader tree, but care is taken to direct the branch leaders into four quarters. Mature trees of 'Baldwin' apple have been successfully converted to this shape. It is claimed that thinning, harvesting, pruning and spraying are easier and that a high percentage of fruit makes the Fancy grade due to its exposure to sunlight.

Oeschberg pruning involves both tree shaping and a routine pruning method. It was developed by HANS SPRENG (1942) at Oeschberg in Switzerland and it is used almost entirely in that country on standard trees. It was fully described by JANS (1947) who claims that once the tree is formed the labour of pruning is considerably reduced compared with some other methods. It does, nevertheless, involve tying down shoots during the early years. The tree consists of a central leader and four well-spaced framework branches arranged around it, the crop being borne mainly on laterals arising from the central leader and from the undersides of the branches. The fruiting wood on these branches is formed by tying down shoots into a horizontal position.

Just before the last war an Australian fruit advisory officer published his experiences in developing trees with unpruned leaders (WICKENS, 1938; 1939). He showed that, despite early cropping, vigorous growth could be maintained and a sound branch framework developed by allowing the leaders to grow unchecked. To ensure maximum growth of the branches the blossoms and young fruitlets were removed from the leaders as were also those shoots which arose near to, and competed with, the unpruned leaders. The main limbs were spread when young to form a broad-based tree and some buds were notched to force out laterals at desired points. My colleague DR. ROGERS, who has just returned from a research visit to Australia, informs me that a method involving a limited number of upright leaders with laterals pruned on the renewal principle, is being used in New Zealand and is included, among others, in a pruning trial in progress at the Fruit Research Station, Havelock North. A single rope or wire loop around the upright leaders keeps the tree in shape. This shape is shown (Text Fig. 1) as a *multiple upright-leader* tree.

PRUNING METHODS

Pruning is not a panacea for all cases of poor tree growth under extreme conditions. Where a tree is lacking in vigour and is in a generally poor condition the mere heading-back of branches and drastic shortening of laterals to induce shoot growth usually fails unless attention is also given to the underground needs of the tree by way of tearing up the grass, irrigation, straw mulching, or some other means of applying or conserving moisture to the tree.

Many different pruning methods may be superimposed upon some of the tree shapes already mentioned. For example, either the open-centre or the delayed open-centre bush tree may be spur-pruned, established-spur-pruned, or renewal-pruned. Sometimes the pruning method is part and parcel of pruning for shape as in the case of the Oeschberg method.

During the first thirty years of this century *spur pruning* was the most common method of pruning apples on so-called 'Paradise' dwarfing rootstocks and pears on quince. In spur pruning one-year laterals arising from branches are cut back to about 3 or 6 inches in length—subsequent shoots from these being shortened to 1 inch to induce fruit spur formation.

Established-spur pruning is a more rational method than the older spur pruning. Strong laterals not required for new branches are cut out completely; very weak ones are shortened to about 3 inches to form induced spurs and shoots from these are shortened back to one inch. Laterals of medium vigour, mainly on the outside of the tree, are left uncut to fruit. These are normally shortened back later to a spur or, if they are becoming crowded or too large, removed altogether. Laterals on spur systems are shortened to 1 inch. Dards and brindles on tip-bearing varieties, such as 'Worcester Pearmain' and 'Early Worcester,'

are left uncut during the early years to provide blossom for pollination and early fruiting.

The renewal principle in fruit tree pruning is not new. FORSYTH (1803) describes it, as applied to apples, with the aid of diagrams early in the nineteenth century. *Renewal pruning* as practised nowadays on apples and pears owes much to the work of THOMPSON (1949). The method results in the bulk of the crop being produced on a successional supply of one-, two-, and three-year laterals. Leader tipping is light and is discontinued after about ten years except on replacement leaders. Thus, with the exception of the crotch, the whole branch framework and fruiting lateral system may be subject to renewal during a period of time. The proportion of laterals shortened or stubbed back depends upon the vigour of the tree. On a typical mature apple tree one-third of the one-year laterals may be cut back each year to 2 or 3 inches to provide more the following year, the remainder being left uncut. A proportion of two-year laterals may be shortened to six or seven fruit buds each year, the remainder being left uncut to become three-year laterals. If growth is vigorous it may be necessary to leave many three-year laterals in for a further year before stubbing them to produce more one-year laterals.

Under tree shaping *regulated pruning* has already been mentioned. It results in the free expression of the "natural habit" for the particular variety. Leader tipping delays bearing and dwarfs the tree and any form of lateral pruning also has a dwarfing effect upon the tree, so the sooner the former can stop and the latter be reduced to a minimum, the earlier and heavier will the tree crop and the sooner will it fill its allotted space. Regulated pruning aims to put these two principles into effect. Leader tipping usually ceases within three years from planting and laterals are neither spur pruned nor shortened. Crowded, thin and weak laterals, irrespective of age, and also those which compete with the unpruned leaders, are removed. As the tree matures, old and shaded fruiting branches are removed to maintain fruit size and quality and adequate shoot growth. Spur systems will develop along the branches and these may need simplification periodically by spur shortening and spur thinning.

RICKS & GASTON (1935) working in the U.S.A. analysed the apple crop in relation to its position on the tree. They confirmed that the poorest coloured fruit was carried in the shaded parts of the tree, usually the centre, but more important still that fruit size was directly related to branch diameter, the thinner laterals carrying the smaller apples. For use on mature trees, where fruit size is small, they formulated the *thin wood* method of pruning. Essentially the tree is pruned by the regulated method until maturity when more attention is given to keeping the centre of the tree free from laterals and branches; all thin wood, that is four-year-old wood the base of which is $\frac{1}{4}$ inch or less in diameter, is also removed.

M. LORETTE is well known for the method of *summer pruning* which

bears his name. At Wagonville he grew not only cordons and fuseaux, but also elaborate fan, espalier, and winged-pyramid trees. The severe dwarfing effect of repeated summer pruning enabled him to maintain these tree shapes on closely spaced trees. There are many different methods of summer pruning nowadays which may be used successfully. One that has given good results at East Malling on cordons involves pruning in mid-July and, occasionally, in mid-September also.

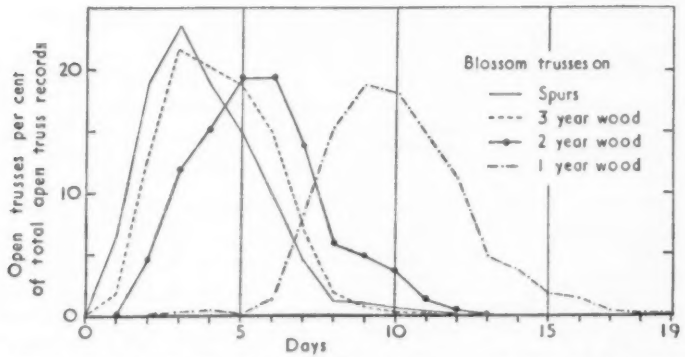
EXPERIMENTAL COMPARISONS

Experimenters in the early part of the century showed clearly the dwarfing effect of pruning on tree size. Severe leader tipping results in much new shoot growth and one is apt to expect the tree to become larger on this account, whereas these shoots must first make up for the parts cut away; usually they do not do so and the tree ends up smaller than one less drastically pruned. GRUBB (1939) investigated different degrees of leader tipping and spur pruning with apples. Leader tipping was found to influence not only tree size, but also other tree characters such as the shape of the head and the furnishing of the branches with spurs. The amount of blossom, the proportion set, and the amount and quality of the fruit were also affected. On fifteen varieties two degrees of spur pruning were tested; in one, laterals not needed as branch leaders were cut to three well-developed buds (1½–2 inches long); in the other, very short spur pruning was done the laterals being cut to one well developed bud (½–¾ inch long). With many varieties these short-spurred laterals died out and, in general, the longer spur pruning gave better results.

The method known as established-spur pruning was recommended by GRUBB as the logical development of his experiments with the more drastic long or short spur pruning. ROGERS & PRESTON (1947) compared the growth and cropping of thirty-year-old vigorous trees of "Cox" pruned by established-spur and renewal methods. All these trees had been pruned by the former method before the trial began. Over a five-year period, but not in every year, renewal-pruned trees yielded the heaviest crops, and each year the colour of the fruit was better from these trees. Blossom records showed that flowers on old spur systems opened first and that these were followed by those on three-year, two-year, and finally one-year-old wood in that order (Text Fig. 2). Established-spur-pruned trees may have more than 90 per cent of their blossoms on older spur systems whereas trees pruned by lighter methods, such as the renewal, which aim at a successional supply of young shoots and branches, have their blossoms distributed on this younger wood (fruiting laterals) as well as on some spur systems. From these observations it seems that these lightly pruned trees are in a more favourable position during the blossom period to secure effective pollination. In a good blossoming year with favourable conditions for insect pollination during the first half of the flowering period, a heavy crop may set on established-spur-pruned trees, but if weather conditions are unfavourable a poor

set of fruit may result. Renewal-pruned trees, however, carrying their blossoms not only on spur systems but also on young wood, have more blossoms open during the latter part of the flowering period than do established-spur-pruned trees. Consequently should the weather conditions be unfavourable during the first part of the period there is ample opportunity for renewal-pruned trees to set a good crop with their later blossoms on young wood.

SWARBRICK & BERRY (1938) at Long Ashton compared the growth and cropping of five apple varieties pruned to open-centre and modified-leader shapes, the pruning being done either in the winter or in the winter and summer. There were also winter-pruned regulated trees. The modified-leader tree was the forerunner of the present-day delayed open-centre tree. All trees in the experiment were treated as open-



TEXT FIG. 2—Relative periods of opening of blossom trusses on old spurs, and on 3-year, 2-year and 1-year laterals of 'Cox's Orange Pippin'.

centre for the first three years and necessitated some corrective pruning, before the differential treatments were applied. The results from this trial showed that pruning reduced yield but a gain in quality followed normal winter pruning. This, with summer pruning, reduced cropping still further but without any compensating increase in quality. 'Worcester', ultimately, cropped better as an open-centre tree than as a modified-leader tree, but the reverse was the case with 'Cox'. Regulated pruning increased the degree of biennial bearing with a variety such as 'Allington Pippin', which is prone to it (JARRETT, 1951) and at East Malling the same thing was shown with the biennial 'Laxtons Superb' (PRESTON, 1957).

Recent work with apples at East Malling has been concerned with a comparison of open-centre and delayed open-centre tree shapes with 'Cox', 'Worcester' and 'Laxton's Superb'; and with established-spur, renewal, and regulated methods of pruning (PRESTON, 1960*a*). With all three scion varieties, shape of tree had no significant effect upon growth,

cropping or branch breakage. Far more important has been the effect of the different methods of pruning. During the early years regulated trees were the largest and established-spur-pruned trees the smallest; by the fourteenth year, however, the heavy cropping of the former trees had altered their shape and the latter were generally taller but rather less spreading than either regulated or renewal-pruned trees. The June drop with 'Cox' was severe in many seasons and records showed that as the degree of pruning became harder from regulated (very light), to renewal (light), to established-spur (medium-hard), so the setting *and* June drop increased (Table I). Thus the higher initial set on established-spur-pruned trees was offset by a more severe 'June' drop (Preston, 1960*b*).

TABLE I

Fruit set and June drop for 'Cox's Orange Pippin' on M.II under different degrees of pruning at seven years

Degree of pruning	*Number of fruit buds*	*Per 100 blossoms*		*Number of picked fruits*
		Set	*June drop*	
Medium-hard	170	23	20	27
Light	526	13	6	217
Very light	908	11	4	381

With both 'Worcester' and 'Cox' established-spur-pruned trees yielded least fruit. The outstanding advantage from established-spur pruning in these trials was with the biennial variety 'Laxton's Superb.' Over the whole period these trees yielded at least as heavily as, and in some cases more so than, regulated and renewal-pruned trees. Furthermore, they have been much less biennial, due probably to the reduction in the number of fruit buds following the stimulation of new shoot growth from the many small cuts made when pruning by this method (PRESTON, 1957). Growers with strongly biennial trees of this variety might try to break the habit by beginning in the winter *before* the next "off" year, making many small cuts rather than a few large ones.

Renewal pruning is well suited to the growth habit of 'Cox', though considerable skill is required in the selection of replacement leaders and in securing a successional supply of new laterals along the branches. If insufficient stubbing of three- and four-year-old laterals is done, there is little or no growth response from the stubs. The method took less time to carry out than did established-spur pruning. Regulated pruning was highly efficient in inducing both 'Worcester' and 'Cox' to bear early and heavily. Few cuts were needed and the method proved the

quickest in the trial and unskilled workers soon acquired judgment in removing wood once the simple basic principles were demonstrated. The heavy cropping of regulated trees means that in some years thinning of the fruit may be necessary to ensure fruit of good size.

As with apples both unpruned and very lightly pruned pear trees show a larger increment in trunk girth and earlier fruit bud formation than do leader-tipped trees. Pears seem to withstand hard cutting better than apples, the hard spurring of laterals usually resulting in the production of blossom buds (AMOS, 1928). In a pear pruning trial carried out by the late MR. JESSE AMOS at East Malling, nine varieties were subjected to hard and light leader tipping, both degrees of tipping being superimposed upon trees with either few or many leaders per tree. It was thought that by restricting the number of branches, and thus the number of fruit buds, the setting of shy bearing varieties might be improved. However, trees with a restricted number of branches produced almost as much blossom as did those with many branches and the difference in set was not appreciable. Light leader tipping resulted in larger trees that cropped earlier and produced more fruit, but it failed to induce early bearing in a slow cropping variety like 'Doyenné du Comice'. Hard leader tipping increased setting but not enough to induce early cropping in varieties that blossom but fail to set well (HOBLYN, 1946).

Few critical experiments have been carried out on plums. This is perhaps because the normal commercial method of growing plums as half-standards is a simple one, little pruning being required after the initial formation of the head. The private gardener has also adopted this form of tree. My colleague DR. BERYL BEAKBANE and I have been conducting a field trial with 'Victoria' plum trees completely unpruned, as summer-pruned pyramids, and with half-standard trees for comparison. The full results are not yet ready for publication, but it seems quite feasible for a private gardener to summer prune his plums to a pyramid shape. Tree size has been considerably restricted, even on the very vigorous rootstock Myrobalan B, and the restriction could be even more so if a less vigorous rootstock, such as St. Julien A, were used. The unpruned tree made a large leaf- and potential fruit-bearing surface and, unlike the half-standard tree whose branches did not reach down to the ground, it made full use of its allotted space. Any pruning of stone fruits should, of course, be carried out during the growing season when risk of disease entry into pruning wounds is least.

Many methods of summer pruning of cordons exist, some being modifications of the method advocated by M. LORETTE. Two commercial methods already in use were tested at East Malling on single oblique apple cordons. In one method pruning was done entirely in summer, in mid-July and mid-September; in the other a light pruning was done in August followed by a more severe one in late December. Generally, the first method gave more satisfactory results (BEAKBANE, 1945); with this method laterals from the trunk are cut back to about 3 inches and

laterals from existing side shoots to about 1 inch at both pruning times. The September pruning is often found unnecessary if the July pruning has been correctly timed according to the development of the shoots rather than by the calendar.

Two methods of pruning dwarf-pyramid apples have also been tried. The first method was similar to the first one already described for cordons, but branch leaders were pruned in winter and laterals summer-pruned to 3 inches in mid-July. With the second method, laterals and branch leaders over 12 inches in length were pruned to about five leaves in mid-July, and any secondary shoots were cut to their point of origin at the end of the growing season. The second method was, therefore, the lighter of the two. Trees pruned by the first method were more upright and stouter in appearance, whereas the second method induced heavier cropping and a more rounded tree shape with a dense head of thinner and finer shoots (BEAKBANE & MARTIN, 1946). A particularly good critique of intensive systems of apple production, with particular reference to dwarf pyramids, has been made by HOBBIS (1945).

A comparative trial of dessert apples under different systems of planting, spacing and shaping has recently been carried out at Long Ashton Research Station (HOBBIS & CATLOW, 1958). Four systems were investigated: (i) bush trees on M.II at 24 feet square (75 trees per acre); (ii) bush trees planted as in (i) with the addition of dwarf bushes on M.IX at 12 feet apart (302 trees per acre in all); (iii) single oblique cordons on M.II at 8 × 3 feet (1,815 trees per acre); and (iv) dwarf pyramids on M.II at 8 × 4 feet (1,361 trees per acre). For 'Cox', up to and including the fifth year when the bush trees were being shaped, both the intensive systems, cordons and pyramids, showed higher yields, as would be expected. By the ninth year the non-interplanted bushes on M.II were yielding about 250 bushels per acre as were the bushes interplanted with dwarf bushes on M.IX, these dwarf bushes adding their own productivity, averaging 200 bushels per acre, to the plot. The cordons averaged 200 bushels per acre from the sixth to ninth years and in the tenth year the crop increased to over 500 bushels per acre. The dwarf pyramids also cropped at over 200 bushels per acre in the sixth year and from the seventh to tenth years the average was also about 500 bushels. Both cordons and dwarf pyramids might have cropped more heavily if they had been on a less vigorous rootstock and summer pruned.

A comprehensive trial of five different pruning methods on thirteen varieties of apples on M.IX was planted in 1951 at the Belgian fruit research station at Gembloux. The treatments were, spindlebush, dwarf pyramid, Oeschberg pruning, open-centre bush with four main branches, and open-centre bush with six main branches. The general conclusion reached from first results during the seven-year establishment period was that the spindlebush and Oeschberg pruning were the two most productive methods. The spindlebush was often equal or

superior to the Oeschberg, but it presented certain difficulties, such as maintaining sufficient vigour in the lower and outer horizontal parts of the tree, and in dealing with the strong vigorous upright shoots arising from the horizontal branches (ANON, 1959).

The pruning terms used in this paper are those recommended in a useful pruning glossary published by the Horticultural Education Association (1955). This glossary is a first attempt by workers in this field to clarify their terms. There exists an extensive literature on the principles and techniques of tree shaping and methods of pruning, only a small sample of which has been mentioned in this paper. From this work it is clear that we now know the basic principles of the different methods and that future work should be directed towards some of the more subtle effects of these different methods in combination. In conclusion perhaps I may emphasize one or two points which could, in my opinion, profitably receive attention. First, a comparison between the different methods of intensive tree growing with special reference to the best use of land, spindlebushes, dwarf pyramids, dwarf bushes and pillars for example, and perhaps a combination of two methods, on different trees, within the same orchard. Secondly, an investigation into the economic and biological effects of tree spacing in relation to tree shape and method of pruning. This last point has already received some attention on the economic side by BUTLER (1950), and by FOLLEY & YATES (1960), and on the biological side by PRESTON (1956), from experimental plantings on the high-land orchard of the NEAME family. In this orchard the cropping of permanent trees was directly affected by tree density, those interplanted with dwarf-bushes yielding 82 per cent more fruit than those not so interplanted, the crop from the filler trees being additional. It is in this tree-to-tree relationship that differences in tree shape may prove important. Perhaps the future will show that the traditional planting of bushes pruned to a uniform shape and method may be improved upon by alternating rows of lightly-pruned regulated trees with rows of more upright and narrow trees of the multiple upright-leader kind.

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AN EXPERIENCE IN THE VALLEY GRASSLANDS

Frank E. Ford

DOCTORS PHILIP A. MUNZ and DAVID D. KECK in their recent volume *A California Flora*, published in London by The Cambridge University Press, have utilized and developed the concept of flower plant communities for natural collections of dominant species.

Let us go into one of the twenty-nine communities they have classified, that of the "Valley Grasslands". This particular one is located

in the southern foothills of the Sierra Nevada at the base of the San Joaquin Valley. It is late in the autumn, the baked brown hills covered with dried plants have gone through a long, hot summer. But now very welcome clouds heavy with moisture are scudding over the hills and soon the parched earth is saturated with the first rainfall of the season. The effect is almost magical, the dusty dry air becomes limpid and fragrant. Millions of baby plants push up and soon the hills are transformed from a flaxen brown to a delicate misty green.

As winter comes, the rate of growth is retarded by the cold, but in an ideal year the weather pattern is a succession of rainstorms, sometimes with a touch of snow, followed by clear warm days when the plants make their greatest growth. This goes on until late March when all is a rich green, the meadow larks whistling their cheerful greeting help make the mood for an exciting approaching occasion. Here and there bits of colour appear. One of the first of the small flowers to greet the spring is the light blue *Nemophila menziesii* (Baby Blue Eyes) charming and ethereal. The plants in moist places are generally scattered, but if ever a mass display is discovered, the sight will never be forgotten. Another low plant often growing with or near the Nemophila is *Platystemon californicus* (Cream Cups) of the poppy family, true to its common name in colour and form. Soon in the more dry locations appears the miniature *Baeria gracilis* (Sunshine Flowers), California's most abundant composite which by the millions carpets vast areas giving them a golden glow and filling the air with an aroma that one often senses before the flowers are seen.

These and many other not so conspicuous species such as *Papaver californicum* (Wind Poppy), *Collinsia heterophylla* (Chinese Houses) and *Dodecatheon patulum* (Shooting Star) show in the lower areas, and as the season advances ascend the hillsides.

With the warmer spring weather at hand the main feature of the display bursts out almost overnight. The accompanying pictures (Figs. 110–111) of this were made in the hills south of Bakersfield. One of the first of the larger plants to appear in large masses is *Monolopia lanceolata* (Hillside Daisy) and various lupins—*Lupinus benthamii* being the most common. The bright yellow of the composite with the complementary blue of the lupin makes a most attractive colour combination. But it is the flamboyant *Eschscholzia californica* (California Poppy) that takes over, converting green hillsides to great sheets of flame. Each species seems to select its favourite soil and moisture condition which helps to produce a mass effect. But the flowers also bloom in great variety and profusion together. Scattered here and there sometimes in small masses are a host of other annuals—gilias, phacelias, coreopses, streptanthus, layias (Tidy Tips), oenothera (Primroses), amsinckias (Fiddle Necks) and cryptanthas (Popcorn Flowers) all in a glorious profusion of hues and fragrance.

Right along with the flowers come the birds, not only the migrants such as the robin, but those who live in the area, the valley quail, the

meadow larks, the song sparrows and the mourning doves, whose songs and calls combined with the beauty and spicy fragrance of the flowers altogether transport one as close to a paradise as might be expected on this earth.

If there is rainfall during this period, the maximum bloom may continue for two or three weeks, but should there come a hot dry wind it quickly vanishes to be replaced by a few late flowers such as the rose purple *Orthocarpus purpurascens* (Owls Clover) and the lavender pink godetias (Farewell to Spring).

The great display is generally over in two or three weeks, seeds develop and the fresh green turns to a straw brown in the dry heat of approaching summer. To continue to see the wild flowers, more as individuals, one must move on and up through the summer to the mountain communities where at the end of the season the brilliant clear coloured alpines will be flourishing until the snows take over in October.

WISLEY TRIALS 1960

BELLIS PERENNIS

Thirty-two stocks of *Bellis perennis* were received for trial at Wisley in 1959. The small-flowered stocks were sown in the open on June 7, 1959, and planted out in the open where they were to flower on August 24, 1959, in rows 12 inches apart, the plants being spaced 6 inches apart in the row. The large-flowered stocks were sown in the open on July 23, 1959, and planted out in the open where they were to flower on September 16, 1959, in rows 15 inches apart, the plants being spaced 12 inches apart in the row.

The trial was inspected by a sub-committee of the Floral Committee A on April 8 and 27, 1960, and on its recommendation the Council has made the following awards to stocks of *Bellis perennis*.

The number in brackets after the description of the stock was that under which it was grown in the trial.

POMPONNETTE RED. (Raised, introduced and sent by Messrs. L. Clause, S.A., Bretigny-sur-Orge, France.) **A.M.** April 8, 1960. Plant vigorous, slightly spreading, very free-flowering; flower stems erect, stout, 6 inches long. Flowers 1 to 1⅛ inches diameter, double; florets fairly long, tubular, a glowing shade of Chrysanthemum Crimson (H.C.C. 824/1). Flowering from March 12. [14]

POMPONNETTE ROSE. (Raised, introduced and sent by Messrs. L. Clause S.A.) **A.M.** April 8, 1960. Plant vigorous, compact, very free-flowering; flower stems erect, stout, 5 to 6 inches long. Flowers 1 1/10 inches diameter, double; florets medium length, tubular, mixed colours, rose, deep rose, crimson and red. Flowering from March 14. [17]

DOUBLE BELLA. (Raised, introduced and sent by Messrs. Vilmorin-Andrieux S.A., 4 Quai de la Mégisserie, Paris, France.) **H.C.** April 8, 1960. Plant fairly vigorous, compact, free-flowering; flower stems erect, stout, 6 to 7 inches long. Flowers 2⅛ to 2⅜ inches diameter, semi-double; florets medium length, Dawn Pink (H.C.C. 523/3), Spirea Red (H.C.C. 025/1) at tips. Flowering from April 1. [28]

LILLIPUT ROSE. (Raised by Messrs. M. Herb, Naples, Italy, introduced and sent by Messrs. E. W. King & Co. Ltd., Coggeshall, Colchester, Essex.) **H.C.** April 8, 1960. Plant vigorous, compact, free-flowering; flower stems erect, fairly stout, 4½ inches long. Flowers 1 inch diameter, double; florets short, slightly drooping, flat, pinkish white, pale pink when fully open. Flowering from March 13. [5]

POMPONNETTE RED. (Raised by Messrs. L. Clause S.A., and sent by Messrs. Charles Sharpe & Co. Ltd., Sleaford, Lincs.) **H.C.** April 27, 1960. Plant very vigorous, fairly compact, very free-flowering; flower stems erect, stout, 6 to 7 inches long. Flowers ⅞ to 1 inch diameter, double; florets medium length, tubular, a glowing shade of Chrysanthemum Crimson (H.C.C. 824/1). Flowering from March 12. [15]

POMPONNETTE ROSE SHADES. (Raised by Messrs. L. Clause S.A., introduced and sent by Messrs. Charles Sharpe & Co. Ltd.) **H.C.** April 8, 1960. Plant vigorous, compact, very free-flowering; flower stems erect, stout, 5 inches long. Flowers 1 1/16 inches diameter, double; florets medium length, tubular, mixed colours, rose, rose with white centre, pink, crimson, red. Flowering from March 14. [19]

POMPONNETTE WHITE. (Raised, introduced and sent by Messrs. L. Clause S.A.) **H.C.** April 8, 1960. Plant vigorous, compact, free-flowering; flower stems erect, stout, 4 to 5 inches long. Flowers 1 1/16 inches diameter, double; florets fairly long, tubular, creamy white. Flowering from March 16. [12]

ROSE CARPET IMPROVED. (Raised, introduced and sent by Messrs. L. Clause S.A.) **H.C.** April 8, 1960. Plant vigorous, compact, very free-flowering; flower stems erect, stout, 4½ to 5 inches long. Flowers 1⅛ inches diameter, double; florets fairly long, a shade near crimson (H.C.C. 22/3). Flowering from March 12. [11]

SUPERB MAMMOTH MIXED SELECTED. (Raised, introduced and sent by Messrs. D. T. Brown & Co. Ltd., Poulton-le-Fylde, Lancs.) **H.C.** April 27, 1960. Plant vigorous, compact, free-flowering; flower stems erect, stout, 7 to 8 inches long. Flowers 2 to 2½ inches diameter, double; florets medium length, mixed colours, white, white with rose centre, white tipped red, white tipped rose. Flowering from April 1. [32]

PYRETHRUMS

The Council has made the following award to a variety of pyrethrum after trial at Wisley, on the recommendation of the Floral Committee A.

The number in brackets after the description of the variety was that under which it was grown in the trial.

VANESSA. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd., Bressingham, Diss, Norfolk.) **H.C.** May 31, 1960. Plant vigorous, compact habit, free-flowering. Flower stems 26 to 30 inches long, erect, stout. Flowers 2 3/16 to 2½ inches diameter, double; ray florets medium width, medium length, drooping, Rhodamine Purple (H.C.C. 29/1); disc florets a colour near Rose Madder (H.C.C. 23/2), orange yellow at centre. Flowering from May 18. [24]

VARIETIES OF TROLLIUS

The Council has made the following awards to varieties of trollius after trial at Wisley, on the recommendation of the Floral Committee A.

The number in brackets after the description of the variety was that under which it was grown in the trial.

FIRST LANCERS. (Sent by The Director, Arboretum, Gen. Foulkesweg 37, Wageningen, Holland.) **H.C.** May 13, 1960. Plant 19½ to 22 inches high, vigorous, compact, erect, free-flowering; flower stems stiff and upright, stout;

flowers $1\frac{7}{16}$ inches diameter, semi-double; florets broad, incurving, a bright shade of Saffron Yellow (H.C.C. 7), sepals Buttercup Yellow (H.C.C. 5). Flowering from May 4. [7]

ORANGE BEAUTY. (Sent by The Director, Arboretum, Wageningen.) **H.C.** May 13, 1960. Plant 12 to 15 inches high, fairly vigorous, compact, erect, free-flowering; flower stems stiff and upright, stout; flowers $1\frac{3}{8}$ inches diameter, semi-double; florets fairly broad, incurving, Tangerine Orange (H.C.C. 9), sepals Cadmium Orange (H.C.C. 8). Flowering from May 4. [3]

AWARD OF GARDEN MERIT—XCVI

449 MAHONIA AQUIFOLIUM 'UNDULATA'

Award of Garden Merit, April 5, 1960

Mahonia aquifolium was introduced to this country in 1823, but remained curiously enough a scarce plant for many years. By 1930, however, when it received an Award of Merit and an Award of Garden Merit, it was to be found in every garden where a low evergreen shrub, tolerant of half shade as well as full sun and the competition of tree roots, or poor, stony soil was required.

It has a wide distribution in its native North-West American habitat. In cultivation as in the wild, it shows considerable variation. Such a plant is the variety 'Undulata' which has now received an Award of Garden Merit.

M. aquifolium can be described as a "runner" when conditions suit it, but the variety 'Undulata' is much less prone to spread. It is more upright and can in fact make an admirable hedge up to 5 feet high. It is a pleasing evergreen with long stalked, lustrous holly-like leaves which are wavy-edged and rather longer and narrower than those of the type plant. It starts to flower as early as February in a mild winter, but is at its most attractive in April when its numerous soft yellow flowers, produced in erect racemes 2 to 3 inches long just below the terminal buds, are particularly pleasing. The flowers are followed by black berries which are not unattractive in the autumn, contrasting with the bronze tinge which the leaves have assumed by then.

M. aquifolium 'Undulata' is not fastidious as to soil. Its good quality as a hedge plant recommends it as a low wind-break in light woodland and the colour of its flowers associates well with the pinks and reds of camellias. It may be increased by removing suckers in the early autumn or spring.

450 VIBURNUM BETULIFOLIUM

Award of Garden Merit, April 5, 1960

It was not until the years between the two World Wars that a plant whose chief merit was its autumn tints or berries, was recognized and received an Award as such. *V. betulifolium* is an outstanding example. It forms an upright, twiggy bush, described by E. H. WILSON who discovered it in Ichang in 1907 as 4–6 feet high. In cultivation it is already

15 feet high. The leaves are small and closely resemble those of a birch. The flat corymbs of numerous small, white flowers are agreeable in May though hardly conspicuous. It is in the autumn when each of its flower-heads has developed its berries that it becomes one of the most beautiful of all berrying shrubs. Each berry is a bright, translucent red, smaller than a red currant but just as attractive. The weight of the glistening heads of berries is such that the formerly upright branches arch and sway most agreeably in the wind.

It received an Award of Merit in 1936 when shown by the late GEORGE JOHNSTONE of Trewithen, Cornwall, which is a sure indication that it thrives as well in a heavy soil in a mild, damp climate as it does, for instance, at Highdown, on the chalk where SIR FREDERICK STERN has splendid bushes. In fact the great branches SIR FREDERICK cuts from his plants have become a feature at autumn shows for some years. It is figured in the *Botanical Magazine*, **132,** t. 8072, and in the R.H.S. JOURNAL, **77,** Fig. 57.

451 VIBURNUM × BODNANTENSE 'DAWN'
Award of Garden Merit, May 3, 1960

In December 1947 the late LORD ABERCONWAY showed and received an Award of Merit for a plant raised from a cross between *V. fragrans* and *V. grandiflorum*. The resulting seedlings of the cross were named *V.* × *bodnantense*, while that seedling which was given the Award was given the clonal name 'Dawn'.

Now *V.* × *bodnantense* 'Dawn' has received an Award of Garden Merit, with every justification, for it combines most happily the best qualities of both its parents. *V. fragrans* has the delightful habit of starting to flower as early as October. Its tubular, daphne-like and pink flushed flowers appear on the bare twigs with every spell of mild weather, culminating with a final outburst in March or April. *V. grandiflorum* only comes into flower in January or February, but *V.* × *bodnantense* 'Dawn' takes after *V. fragrans*. Its flowers, however, are more the larger, laxer, deep rose of *V. grandiflorum*. They are sweet-scented, weather resistant and with just that quality of spring to make them endearing on the most depressing winter's day. *V.* × *bodnantense* 'Dawn' has the stouter wood of *V. grandiflorum* and its more substantial, darker green leaves. On the other hand it has not the latter's rather gaunt habit, being, like *V. fragrans*, more shapely and better furnished. It was already 12 feet high at Bodnant in 1950.

V. fragrans will always be associated with REGINALD FARRER. The majority of the original plants in cultivation were raised from seed sent back by him from Kansu in 1914. The late E. A. BOWLES received an Award of Merit when he showed it in 1921. This was followed by an Award of Garden Merit in 1923.

V. grandiflorum was collected by R. E. COOPER, also in 1914. It was not, however, until 1937 that it received an Award of Merit when shown by the late LORD ABERCONWAY.

V. × *bodnantense* 'Dawn' is hardy and enjoys any good garden soil, having no marked likes or dislikes. It may be increased by cuttings taken of the current year's growth, quite early before the wood has hardened and with a heel.

It is figured in the *Botanical Magazine*, N.S. **167**, t. 113, and the R.H.S. JOURNAL, **73**, Fig. 20; **75**, Fig. 25; and **77**, Fig. 53.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1959 AND 1960

Cypripedium calceolus A.M. May 23, 1959. The rare 'Ladies Slipper Orchid', possibly still native in one or two areas in England, has ovate, acuminate, many-nerved, shortly hairy, plicate leaves, sheathing at the base, about 7 inches long and 3 inches wide. The flowers carried singly on stems about 1 foot high have narrow, twisted, spreading sepals and petals about 2½ inches long and ⅓ inch wide, Maroon (H.C.C. 1030) in colour, and a Dresden Yellow (H.C.C. 64) slipper-like labellum about 1½ inches long and ¾ inch wide, spotted dark red inside. Exhibited by Major and Mrs. Knox Finlay, Keillour Castle, Methven, Perthshire.

Narcissus 'Arctic Gold', F.C.C. April 12, 1960, as a show flower. A full description was published last year, (Part 12, p. 533) when it received the Award of Merit (April 7, 1959).

Calceolaria integrifolia var. angustifolia A.M. May 3, 1960. A slender-stemmed shrub for the cool greenhouse with rugose, lanceolate, irregularly dentate leaves about 4 inches long on the cut specimens shown. The small, pouched flowers, each about ½ inch across, are near to Aureolin (H.C.C. 3) in colour and are borne in large terminal panicles. Exhibited by L. M. Mason, Esq., Talbot Manor, Fincham, King's Lynn, Norfolk.

Hosta fortunei var. albopicta A.M. May 23, 1960. A most attractive plantain lily which was given the award as a foliage plant. The large ovate, acuminate, subcordate leaves, with leaf blades about 9 inches long and 6 inches across and leafstalks about 1 foot long, are yellowish-green in colour with a deeper green margin. The yellow-green colour of the leaves gradually becomes darker green with age, but in the early part of the year the large clumps of leaves are very effective in the shrub and herbaceous borders. Exhibited by The Sunningdale Nurseries, Windlesham, Surrey.

Leycesteria crocothyrsos A.M. May 3, 1960. A vigorous shrub, native to Assam, which grows to a height of 6 or 8 feet, and in this country needs the protection of a cool greenhouse. The long, slender growths bear opposite, ovate, downy leaves up to 6 inches long and terminate in 6-inch, arching racemes of bell-shaped flowers. The individual flowers carried in whorls of six on the inflorescence are about ¾ inch across and

Buttercup Yellow (H.C.C. 5/1) in colour. Exhibited by L. M. Mason, Esq., Talbot Manor, Fincham, King's Lynn, Norfolk.

Libertia grandiflora A.M. May 23, 1960, as a hardy, herbaceous plant. A useful early-flowering plant for the herbaceous border, belonging to the Iris family, with tufts of long narrow leaves about 2½ feet long and ½ inch wide, and erect flower stems about 3 feet long, bearing several groups of pure white flowers, each about 1¼ inches across, in the axils of bracts on the upper half of the stem. Exhibited by Lord Aberconway and The National Trust, Bodnant, Tal-y-cafn, N. Wales.

Narcissus 'Candida', A.M. April 12, 1960, as a show flower. Division 4, double Narcissus. Stem 20 inches long; flower 4⅛ inches diameter; outer perianth segments 1⅞ inches long, 1⅞ inches wide, overlapping, slightly incurving and inflexed, blunt; flower white. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford, Eire.

Piptanthus laburnifolius (syn. P. nepalensis) A.M. May 23, 1960, as a half-hardy flowering shrub. An attractive, half-evergreen shrub, native to the Himalayas, which reaches a height of 9 or 10 feet in this country, but unfortunately is liable to be severely damaged in a hard winter, and so requires a sheltered position in all but the most southerly gardens. The leaves, each consisting of three sessile, narrowly elliptic, entire leaflets about 4 inches long, are a dark, shining green above and glaucous beneath, contrasting well with the yellow flowers which are carried in upright terminal racemes. The individual, typically leguminous flowers are about an inch long and Sulphur Yellow (H.C.C. 1) in colour. Exhibited by G. L. Pilkington, Esq., Grayswood Hill, Haslemere, Surrey.

Rhipsalidopsis rosea A.M. May 23, 1960, as a plant for the cool greenhouse. A most attractive plant, closely related to the well-known 'Easter Cactus', *Rhipsalidopsis* (*Schlumbergera*) *gaertneri*, which is suitable for use as a house or basket plant. The flattened, pendent stems are jointed, with obovate-oblong segments 1–1½ inches long, bearing tufts of hairs on the remotely serrate margins. The terminal, slightly tubular flowers measuring an inch or more across are Fuchsine Pink (H.C.C. 627/1–2) in colour darkening towards the centre, with prominent yellow anthers. Exhibited by W. T. Capon, Esq., 6D Broad Green Wood, Bayfordbury, Hertford, Herts.

Rosa banksiae lutea A.M. May 23, 1960, as a hardy flowering climbing plant. The 'Yellow Banksian Rose' is a vigorous climber, easily reaching 20 feet in a suitable situation and has long been known and valued in gardens for its numerous, early, double yellow flowers which are freely produced in clusters on long, arching, branches during May. The individual leaves consist of 3 or 5 ovate-elliptic leaflets about 1½ inches long with serrulate margins. The double flowers are about 1 inch across and near to Chrome Yellow (605/1–605/2) in colour, but have little or no scent. Exhibited by The Sunningdale Nurseries, Windlesham, Surrey.

Stauntonia hexaphylla A.M. May 3, 1960. An extremely vigorous evergreen climbing plant soon reaching a height of 30 feet, with long-stalked, palmate leaves, and ovate, dark green leaflets about 4 inches long. The flowers are unisexual and in the male plant exhibited they were borne in clustered, axillary four- or five-flowerd racemes. The individual flower has six greenish-white perianth segments, stained dull red inside and is agreeably scented. Exhibited by Sir Henry Price, Bt., Wakehurst Place, Ardingly, Sussex.

BOOK NOTES

"Gardening in Britain." By Miles Hadfield. 482 pp. Illus. (Hutchinson, London.) 63*s*.

This book is that rare thing, an important historical book, the result of exhaustive research and irreproachably documented, yet written with the greatest lightness and liveliness. It is nothing less than a history of one facet of the English genius, the national passion for gardening.

The first chapter covering the period up to 1529, when, it has to be admitted, that there was little gardening in England, and that there is very little known about what there was, is a model of historical conjecture and reconstruction. Thereafter, as more material becomes available, the historian of gardening is confronted, as is the historian of any activity of which few formal records are kept, with not only the problems of research into original sources, but also with those of discovering the sources themselves. Mr. Hadfield's immense reading has explored the widest possible territory and the result is an extraordinarily rich harvest of valuable and entertaining information, all set out in a most readable narrative. His erudition is amazing. For example, how many readers today are acquainted with even the title of the novel by R. D. Blackmore, *Kit and Kitty*, having as its subject fruit-growing in the 1860's, not even mentioned in the *Oxford Companion to English Literature*, and of which Mr. Hadfield gives a synopsis ?

Every aspect of gardening and related activities has been investigated and chronicled, and the development of the garden in all its forms is portrayed. The great landscape architects and garden designers, plant-collectors, nurserymen, botanical artists and horticultural journalists; the figures professional and amateur, who have in any way contributed to the evolution of the British garden; all are here. And in the later pages some account is given of many happily remembered and others still happily known to readers of this JOURNAL. Special mention must be made of a subject with which Mr. Hadfield deals very adequately, and which has hitherto not received the attention of the historian, the nursery-gardens of Great Britain. I have looked into this to some extent myself and can testify to its difficulties and to the excellence of Mr. Hadfield's work upon it. This book is likely to go into many editions, so it is not mere cavilling to point out two misspellings. Wherever mentioned, including the index, the name of the late Canon Rollo Meyer, breeder of irises and daffodils, has been spelt "Myer". In the section on Repton, "Sotherton", the seat of Mr. Rushworth in Jane Austen's *Mansfield Park*, has consistently been spelt "Gotherton", even in a long passage quoted from the novel. But these are small matters and will not prevent the book for long being the standard work on gardening in England. Indeed, it is hard to see that it can ever be superseded.

MORTON

ORDERS FOR BOOKS

The Society does not sell any publications other than it's own. Orders for books reviewed should therefore be sent direct to the booksellers and not to the officers of the Society.

ERRATUM

R.H.S. JOURNAL, August 1960, Vol. **84**, p. 370.—Rhubarb 'Rosenhagen' H.C. April 22, 1960, should read 'Rozenhagen'.

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OAKWORTH

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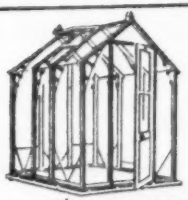

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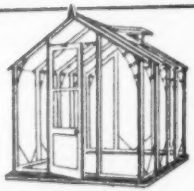

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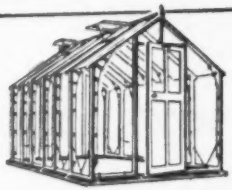

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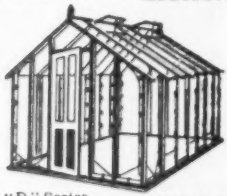

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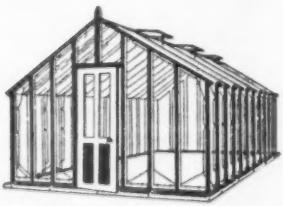

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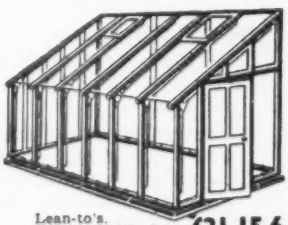

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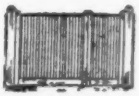

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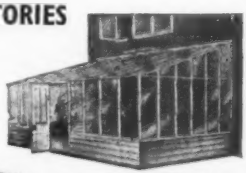

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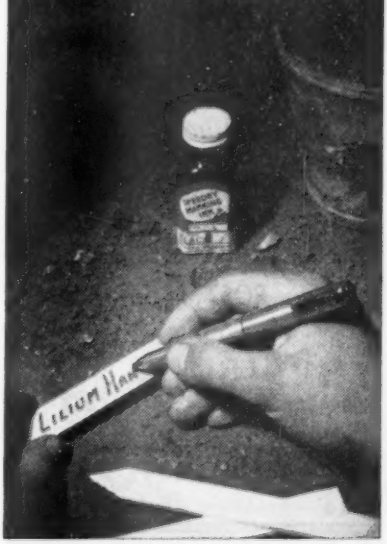

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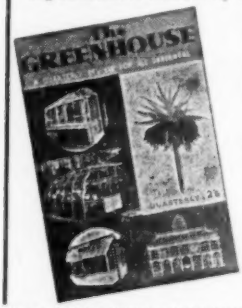

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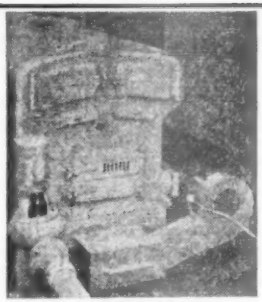

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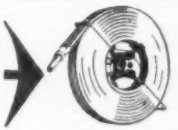

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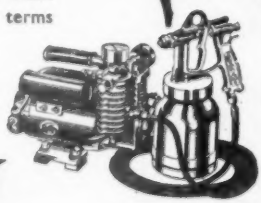

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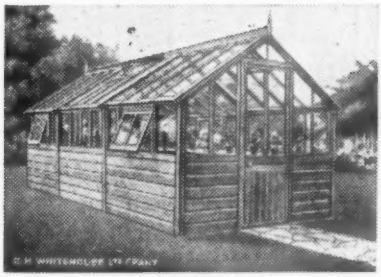

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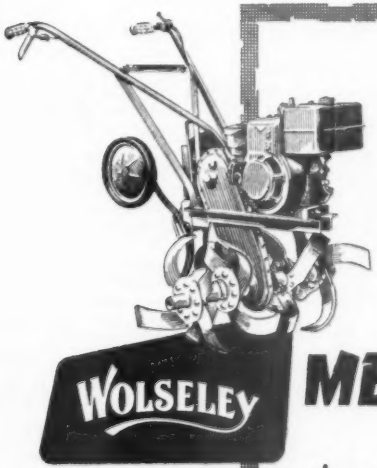

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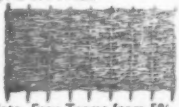

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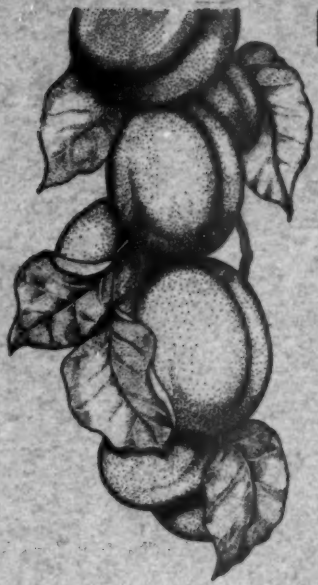

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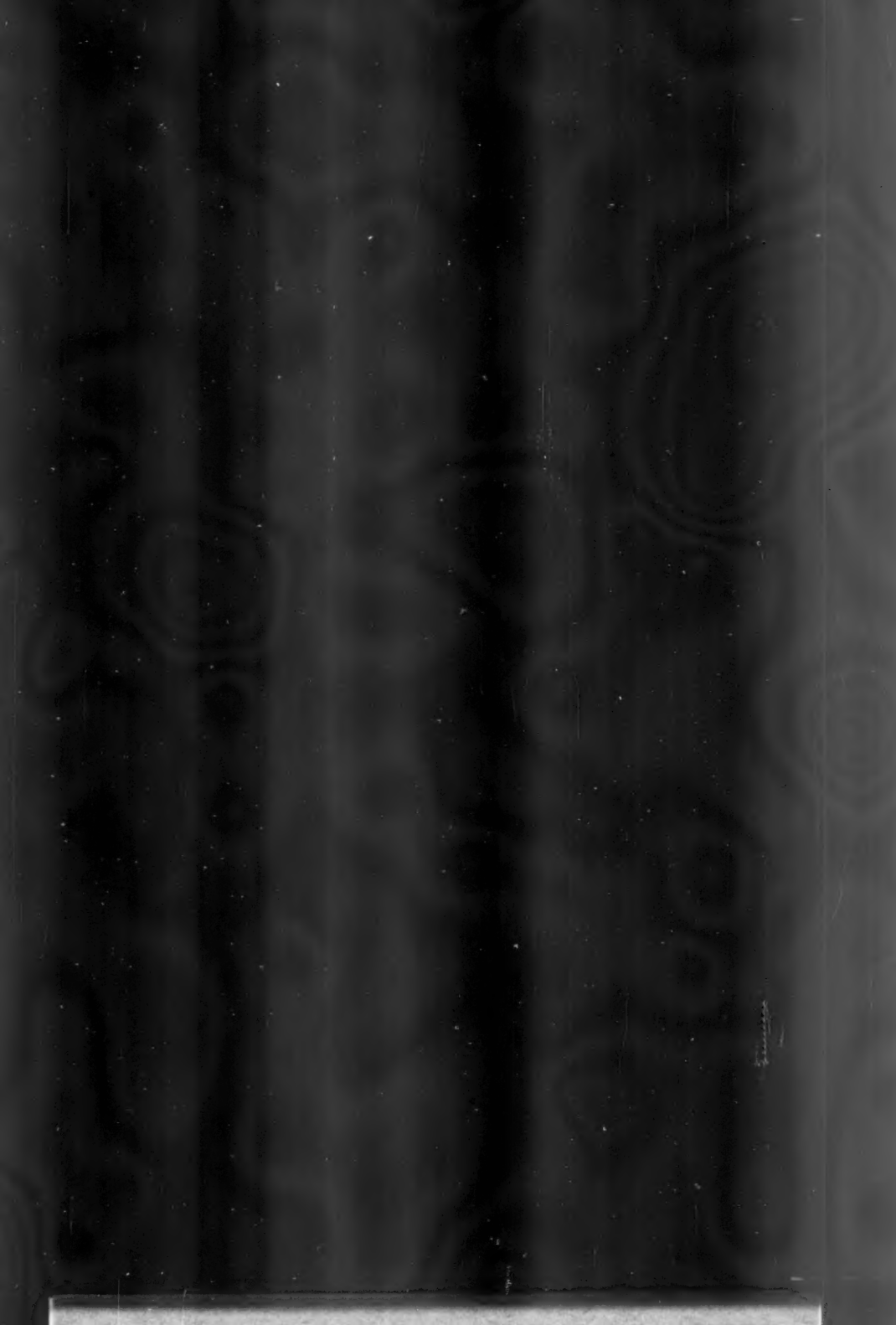
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